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June 23, 2020

Andrew Johnston, Executive Secretary
Maryland Public Service Commission
6 St. Paul Street, 16th Floor
Baltimore, Maryland 21202

Re: Case No. 9619 – Errata to OPC Comments and Synapse Report on Energy Storage Pilot Program Applications

Dear Mr. Johnston:

Please accept for filing this Errata to the June 19, 2020 comments by the Office of People's Counsel ("OPC") and the enclosed report from Synapse Energy Economics, Inc. addressing the Energy Storage Pilot Program applications filed on April 15, 2020.[1]

This Errata does not make any changes to OPC's comments, or to Synapse's report. Rather, the purpose of this Errata is limited to correcting the package of data responses attached to OPC's June 19th filing. The process of converting certain Excel files produced in discovery to PDFs resulted in formatting errors. In addition, OPC discovered after the filing that several data responses that should have been included were inadvertently omitted.

I. Background

On April 15, 2020, the Joint Exelon Utilities -- Baltimore Gas and Electric Company ("BGE"), Delmarva Power & Light Company ("Delmarva"), and Potomac Electric Power Company ("Pepco") – each filed two applications for energy storage projects pursuant to Public Utilities Article ("PUA") § 7-216 ("the Statute"). On the same date, the Potomac Edison Company ("PE") also filed applications for two energy storage applications pursuant to the Statute.

OPC retained Synapse Energy Economics, Inc. ("Synapse") to assist with reviewing the applications and to provide technical analysis and recommendations. With Synapse's assistance, OPC prepared extensive discovery requests for each of the four utilities, seeking information and

[1] OPC also encloses the data responses cited in Synapse's report.

data on their energy storage applications. After analyzing the applications and the companies' responses to OPC's data requests and to the Commission Technical Staff's ("Staff") data requests, Synapse consultants Courtney Lane, Dr. Erin Camp and Dr. Steve Letendre authored a report containing their findings. That report is enclosed.

Synapse's report contains a detailed discussion of the Statute's application requirements and the report of the Energy Storage Working Group. OPC will not repeat those discussions here, but notes that on the subject of Commission review of energy storage applications, subsection (h) of the Statute provides the following:

> (4)(i) The Commission shall solicit comments from the Maryland Energy Administration, the Office of People's Counsel, and other stakeholders and hold a hearing on each application submitted under subsection (d) of this section.
> (ii) The Commission shall approve, approve with modifications, or reject an application submitted under subsection (d) of this section after:
> 1. receiving comments from the Maryland Energy Administration, the Office of People's Counsel, and other stakeholders and holding a hearing;
> 2. considering the projected costs and benefits of the projects proposed for inclusion in the pilot program; and
> 3. determining whether the project is in the public and ratepayer interest.
> (5)(i) If the Commission rejects an application, within 3 months after receiving notice of the rejection of an application, the investor-owned electric company shall submit an amended application for Commission approval.
> (ii) The Commission shall approve, approve with modifications, or reject an amended application within 3 months after receipt of the amended application.

Based on Synapse's report and based on its own analysis of the applications and discovery responses, and in accordance with these terms, OPC recommends that the Commission reject one of the eight storage applications before the Commission – PE's Town Hill project – and recommends "approval with modifications" of the remaining seven projects before the Commission.

II. Comments and Recommendations

Using the December 31, 2019 report of the Energy Storage Working Group as a starting point, Synapse assessed the costs and benefits of each of the eight projects before the Commission. Without repeating all of the specifics for each proposed project and the technical details behind Synapse's analysis, OPC provides the following summary of Synapse's findings with respect to each project, and Synapse's and OPC's recommendations to the Commission for each project.

Potomac Edison

Synapse concluded that PE made several errors in its quantification of benefits with respect to both of its proposed storage projects. First, contrary to the recommendations of the Working Group, it did not use the values for peak versus non-peak energy used in the analysis of EmPOWER Maryland programs. Rather, it used one-year of PJM locational marginal pricing data

to support an unreasonably high peak price and an unreasonably low off-peak price. Second, PE includes deferral value in its benefits calculation despite the fact that it has not determined when the traditional deferred projects would have begun. Moreover, even if it were appropriate to count deferral benefits, Potomac Edison's calculated deferral values are flawed in that they do not use the net-present value of the deferred projects full revenue requirements. Third, PE used a low peak shaving value of $1.5/kW-month to perform its peak shaving value calculations for both of its proposed projects The low capacity value resulted in *undervaluing* the peak shaving benefit. Furthermore, PE failed to take the present value of the stream of annual peak shaving values. Finally, PE made an error in calculating PJM reserve market revenues. These errors are discussed in detail at pp. 14-18 of Synapse's report.

Synapse also concludes that PE overstated the qualitative benefits of its storage proposals. PE touts the KW hosting capacity that will be available on two circuits as a result of the projects, but anticipates only a relatively minor amount of solar installed on those circuits over the next 10 years. PE also claims additional benefits from frequency regulation, voltage support, and hosting capacity augmentation, but provides no commitment from either it or its third-party vendor to provide such benefits.

Finally, PE also made errors in its assessment of the environmental impact of its proposed projects. PE calculates that the Town Hill project will *displace* 12.7 short tons of CO_2 per "cycle" and Little Orleans will *displace* 7.7 short tons of CO_2 per "cycle." However, PE multiplied those values by 250 cycles, rather than the 20 cycles of peak-shifting stated in the utility's proposal. The methodology recommended by the PC44 working group only applies to hours in which load is shifted from an on-peak hour to an off-peak hour. Not only is PE inflating the number of cycles used per year, but the utility is also assuming that all the outage events associated with the Town Hill and Little Orleans BESS projects will be peak-shifting when the projects are planned to be used at other times. These errors are discussed in detail at pp. 21-23 of Synapse's report and Synapse's findings are discussed below for each project.

1. *Town Hill*

PE's own benefit cost analysis ("BCA") of the Town Hill project yielded a result of 0.268. Synapse performed two new cost-benefit analyses for this project, one using corrected deferral values, and one eliminating deferral values entirely. Both of Synapse's analyses used corrected peak shaving values and energy conservation at peak values. The Synapse BCA that eliminated deferral values entirely – the one that Synapse recommends that the Commission use -- coincidentally ended with a very similar benefit cost ratio ("BCR") as PE -- 0.273. The Synapse BCA that included value for the asserted deferral, but at a level corrected by Synapse, resulted in a BCR of 0.65. The calculations supporting these results can be found at pp. 19-21 of Synapse's report.

After correcting the errors in PE's environmental impact calculation, Synapse concluded that the Town Hill project will result in a net *increase* in emissions of 22 tons of CO_2 annually. This increase results from the storage unit using more energy for charging than it provides onto the grid and the timing of the planned use.

Synapse points out that this project's already low BCR would be even lower if the modeled impacts of carbon emissions were considered. Moreover, the Town Hill project would examine a use case that is almost identical to that proposed in the Little Orleans project, but as Synapse points out, would likely provide fewer learnings to PE since it would be third-party owned and operated. For these and the above reasons, the Town Hill project is not "in the public and ratepayer interest," and OPC recommends that the Commission reject it.

2. Little Orleans

PE's own cost-benefit analysis of the Little Orleans project yielded a result of 0.77. Synapse performed two new BCAs for this project, one using corrected deferral values, and one eliminating deferral values entirely. Both of Synapse's analyses used corrected peak shaving values and energy conservation at peak values. The Synapse BCA that eliminated deferral values entirely – the one that Synapse recommends that the Commission use -- ended with a BCR of 0.28. The Synapse BCA that included value for the asserted deferral, but at a level corrected by Synapse, resulted in a BCR of 0.69. The calculations supporting these results can be found at pp. 19-21 of Synapse's report.

After correcting the errors in PE's environmental impact calculation, Synapse concluded that the Little Orleans project will result in a net *increase* in emissions of 33 tons of CO_2 annually. This increase results from the storage unit using more energy for charging than it provides onto the grid and the timing of the planned use.

Once errors are corrected, the Little Orleans project has a BCR that is only marginally better than the Town Hill project. Further, the Little Orleans project will not have an environmental benefit. However, the project has value as a pilot given the fact it will provide learnings to Potomac Edison, which will own and operate the project. Moreover, the project will also provide reliability benefits to customers. For these reasons, OPC recommends Commission approval of the project. However, the Commission should require PE to correct the errors identified above so that the Commission has an accurate baseline by which to judge the success of the project as the Energy Storage Pilot Program proceeds.

In addition, OPC notes that PE identifies certain qualitative benefits associated with the Little Orleans project including NOx emissions reductions, resilience, and grid operational flexibility. PUA § 7-216(h)(7)(i) provides that the utilities participating in the pilot program must provide "information or data" concerning 48 separate topics in 2023, 2024, and 2025. The last of these 48 items is a catch-all -- "any other information required by the Commission." OPC recommends that the Commission require PE to quantify these currently qualitative benefits when it files its annual reports pursuant to PUA § 7-216(h)(7)(i). If the Company cannot quantify these benefits at the time that it files these reports, PE should explain why the benefits cannot be quantified.

<u>BGE</u>

Synapse reviewed the stated costs and benefits of BGE's proposed projects and found that the methodologies and assumptions were sound. Synapse concurs with BGE that the Fairhaven

project is cost effective. However, the proposed capital costs appear high compared to recent industry benchmarking studies. This appears to be due to the Company's inclusion of a contingency percentage in its cost estimates. Considering the Exelon Utilities' limited experience with projects of this kind, Synapse agrees with Exelon's inclusion of contingency costs for the purposes of performing a cost-benefit analysis for these future projects.[2]

However, with respect to environmental impacts, Synapse points out that BGE's calculations omit any emissions associated with the round trip efficiency ("RTE") losses of the battery. See p. 6 of Synapse's report for an explanation of RTE. Further, a battery that is discharged primarily in the winter is unlikely to provide net emissions benefits, given that winter marginal emissions deltas have historically been low or negative. Based on the hours when these batteries are expected to operate, the two batteries together will have a net *increase* in emissions of 22 tons of CO_2 annually.

Another concern that Synapse has with respect to the Fairhaven project is that a major component of its value lies in its planned participation in PJM markets. As Synapse points out at pp. 9-12 of its report, there is significant risk in such projections, namely the possibility of oversaturated wholesale ancillary services markets, particularly for the frequency regulation market, which will depress prices.

Despite the noted concerns, BGE's proposed projects are cost effective and OPC recommends approval of both of them. However, OPC's recommendation in this regard is conditioned on the Commission requiring that BGE demonstrate that the Fairhaven and Chesapeake projects meet all technical specifications and performance standards for participation in PJM's wholesale markets. The Commission should also require BGE to demonstrate that the PJM market revenues for the Chesapeake project to be gained by the third-party owner and operator are reflected in the contract price.

In addition, OPC notes that BGE identifies certain qualitative benefits associated with its projects including NOx emissions reductions, reliability and resilience, grid operational flexibility, and distributed generation hosting capacity. Pursuant to PUA § 7-216(h)(7)(i)(48), OPC recommends that the Commission require BGE to quantify these currently qualitative benefits when it files its annual reports pursuant to PUA § 7-216(h)(7)(i). If the Company cannot quantify these benefits at the time that it files these reports, BGE should explain why the benefits cannot be quantified.

<u>Delmarva</u>

1. *Elk Neck*

Synapse recommends that potential PJM Market revenues should not be counted as a quantified benefit in the BCA for this project because virtual power plants do not currently qualify for participation in PJM's wholesale power markets. Removing these revenues lowers the BCR

[2] To the extent BGE or any other Exelon utility includes the projected costs of energy storage projects in the calculation of a revenue requirement in a multi-year rate plan, OPC would oppose the inclusion of contingency costs.

to 0.14. In light of the low BCR, Synapse recommends that the Commission direct Delmarva to seek to include customers with existing solar PV systems in the pilot. This will lead to additional learnings and benefits of the platform and increase carbon emissions reductions. Synapse also recommends that the Commission require Delmarva to coordinate its other customer offerings (EmPOWER incentives, direct-load control programs, time-of-use rates) with the Elk Neck pilot and examine whether additional benefits can be obtained from integrating additional customer devices into the platform. Finally, in light of Delmarva's claim that customers may realize additional efficiency and savings benefits from the batteries, Synapse recommends that Delmarva track and quantify these benefits over the course of the pilot.

With respect to its environmental impact, Synapse concludes that once RTE is factored in, and more granular marginal emissions data is used, that this project will have a negligible environmental impact.

Despite its low BCR, OPC recognizes that this is the only proposal examining the virtual power plant business model and is therefore an important learning tool for the state. For that reason, OPC recommends approval of the project subject to the Commission's adoption of Synapse's above recommendations.

In addition, OPC notes that Delmarva identifies certain qualitative benefits associated with the Elk Neck project including avoided residential outages, NOx emissions reductions, EV transportation, resilience, grid operational flexibility, and distributed hosting capacity. Pursuant to PUA § 7-216(h)(7)(i)(48), OPC recommends that the Commission require Delmarva to quantify these currently qualitative benefits when it files its annual reports pursuant to PUA § 7-216(h)(7)(i). If the Company cannot quantify these benefits at the time that it files these reports, Delmarva should explain why the benefits cannot be quantified.

2. Ocean City

Delmarva's own BCA for the Ocean City project resulted in a BCR of 0.45. With respect to its environmental impact, Synapse concludes that once RTE is factored in, and more granular marginal emissions data is used, the Ocean City project will have a net *increase* in emissions of 11 tons of CO_2 annually based on the hours when the Ocean City project is expected to operate.

Like the BGE Fairhaven project, much of the Ocean City project's value lies in its planned participation in its planned participation in PJM markets. As discussed above and at pp. 9-12 of Synapse's report, there is significant risk in such projections.

In addition, OPC notes that Delmarva identifies certain qualitative benefits associated with the Ocean City project including NOx emissions reductions, EV transportation, resilience, grid operational flexibility, and distributed hosting capacity. Pursuant to PUA § 7-216(h)(7)(i)(48), OPC recommends that the Commission require Delmarva to quantify these currently qualitative benefits when it files its annual reports pursuant to PUA § 7-216(h)(7)(i). If the Company cannot quantify these benefits at the time that it files these reports, Delmarva should explain why the benefits cannot be quantified.

Despite its low BCR, OPC recommends that the Commission approve the Ocean City project. As a utility owned and operated project, the Company should be able to derive helpful learnings by comparing its experience with this project to the Elk Neck project. Moreover, it will be important to use this project to determine the extent to which the qualitative benefits are realized. However, OPC endorses Synapse's recommendation that the Commission require Delmarva to demonstrate that the Ocean City project meets all technical specifications and performance standards for participation in PJM's wholesale markets.

Pepco

Synapse reviewed the stated costs and benefits of Pepco's proposed projects and found that the methodologies and assumptions were sound. Synapse concurs with Pepco that its two proposed projects are cost effective. However, the proposed capital costs appear high compared to recent industry benchmarking studies. This appears to be due to the Company's inclusion of a contingency percentage in its cost estimates. Considering the Exelon Utilities' limited experience with projects of this kind, Synapse agrees with Exelon's inclusion of contingency costs for the purposes of performing a cost-benefit analysis for these future projects.[3]

1. National Harbor

With respect to its environmental impact, Synapse concludes that once RTE is factored in, and more granular marginal emissions data is used, and based on the hours when the National Harbor project is expected to operate, it will have a net *increase* in emissions of 11 tons of CO_2 annually.

Like several other projects mentioned above, this project's value lies, in part, in its planned participation in PJM markets, which carries risk.

Notwithstanding the above concerns, the National Harbor project has a positive BCR and the General Assembly has passed a statute intended to incent energy storage in the State. As such, OPC recommends that the Commission approve the project, provided that Pepco demonstrates that the project meets all technical specifications and performance standards for participation in PJM's wholesale markets.

In addition, OPC notes that Pepco identifies certain qualitative benefits associated with the National Harbor project including NOx emissions reductions, resilience, grid operational flexibility, and distributed hosting capacity. Pursuant to PUA § 7-216(h)(7)(i)(48), OPC recommends that the Commission require Pepco to quantify these currently qualitative benefits when it files its annual reports pursuant to PUA § 7-216(h)(7)(i). If the Company cannot quantify these benefits at the time that it files these reports, Pepco should explain why the benefits cannot be quantified.

2. Montgomery County Bus Depot

[3] *See* FN 2, *supra*.

With respect to its environmental impact, Synapse concludes that once RTE is factored in, and more granular marginal emissions data is used, and based on the hours when the Montgomery County Bus Depot project is expected to operate, it will have a net *decrease* in emissions of 11 tons of CO_2 annually.

Because of its cost effectiveness and its environmental benefits, OPC recommends approval of the Montgomery County Bus Depot project. However, OPC agrees with Synapse's recommendation that the Commission condition its approval on the condition that the battery be charged by the natural gas generator only as a last resort (if solar panels are not producing energy and if the signal tells the battery to charge for an anticipated peak event).

In addition, OPC notes that Pepco identifies certain qualitative benefits associated with the bus depot project including NOx emissions reductions, EV transportation, resilience, grid operational flexibility, and distributed hosting capacity. Pursuant to PUA § 7-216(h)(7)(i)(48), OPC recommends that the Commission require Pepco to quantify these currently qualitative benefits when it files its annual reports pursuant to PUA § 7-216(h)(7)(i). If the Company cannot quantify these benefits at the time that it files these reports, Pepco should explain why the benefits cannot be quantified.

III. Conclusion

OPC recognizes that in passing PUA § 7-216 the General Assembly intended to promote energy storage projects in the State. After carefully considering the 8 proposed projects before the Commission in light of the Statute, the applications, the discovery responses, and its consultant Synapse's analysis, OPC recommends that the Commission approve all projects before it, with the exception of PE's Town Hill project. For the reasons stated above, OPC's position is that that project is not consistent with "the public and ratepayer interest," the standard for the Commission's review of these projects.

As also detailed above, OPC conditions its recommendation that the Commission approve the remaining 7 projects on the Commission's imposition of additional requirements. In OPC's view, its proposed conditions for these projects help to make these projects more consistent with "the public and ratepayer interest."

Thank you for your consideration of these comments and of Synapse's enclosed report.

Very truly yours,

/electronic signature/
Joseph G. Cleaver
Senior Assistant People's Counsel

JGC/bl
Enclosures
cc: All Parties of Record

Comments Case No. 9619

Utility Pilot Energy Storage Project Applications

Maryland Office of the People's Counsel

June 19, 2020

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CONTENTS

1. BACKGROUND

In September 2016, the Maryland Public Service Commission ("Commission") established Public Conference ("PC") 44 in order to undertake a "targeted review of key aspects of Maryland's electric distribution systems." The Commission identified several grid modernization topics that it intended to examine, including energy storage. Subsequently, in January 2017, the Commission issued an order in PC 44 establishing an Energy Storage Working Group. The Commission instructed the group to consider the benefits of energy storage technology and determine the criteria for evaluating the adoption of storage technology as a distribution system asset.

While the Working Group was actively meeting, the Maryland General Assembly passed Senate Bill 573, known as the Energy Storage Pilot Program Act (the "Act"), which Governor Larry Hogan signed into law on May 13, 2019. The law, codified at Maryland Public Utilities Article § 7-216, establishes an Energy Storage Pilot Program that would be administered by the Commission. It requires each Maryland investor-owned electric distribution company (EDC) to solicit offers to develop energy storage projects and to submit at least two energy storage proposals for the Commission's consideration. The statute identifies specific information that must be included in each proposal. The total capacity for the combined storage projects across all utilities included in the Energy Storage Pilot Program is not to exceed 10 megawatts (MW) of capacity.

PUA § 7-216 identifies four energy storage project ownership/operation models for the electric distribution companies to consider:

- *Model 1:* A "utility-only" model under which the electric company would own the project, control the project for grid reliability, and operate the project in wholesale markets or other applications when not providing grid services;
- *Model 2*: A "utility and third-party" model under which the electric company would own the project and control the project for grid reliability, and a third party would operate the project in wholesale markets or other applications when the project is not providing grid services
- *Model 3*: A "third-party ownership" model under which the electric company would: (i) contract with a project owned by a third party for grid reliability; and (ii) allow the third party to operate the project in wholesale markets or other applications when the project is not providing grid services; and
- *Model 4*: A "virtual power plant" model under which: (i) the electric company would aggregate or use a third-party aggregator to receive grid services from distributed energy storage projects owned by customers or a third party; and (ii) the projects would be used by the customers or third party for other applications when the projects are not providing grid services.

Under the statute, one of the two projects each utility applies for must be from either Model 3 or Model 4.

On August 23, 2019, the Commission issued Order 89240, which established Case No. 9619 and tasked the PC 44 energy storage Working Group with developing proposed metrics and value streams that could be used by the Commission to evaluate the proposed storage projects submitted under the new law. On December 31, 2019, the Working Group leader submitted a report in the 9619 docket identifying proposed metrics and value streams for the Commission's consideration in its evaluation of energy storage proposals submitted pursuant to PUA § 7-216. The report included recommended valuation methodologies for each quantifiable benefit that energy storage provides to customers and the grid. The PC44 Working Group recognized that some value streams could be quantified using dollars and others could not. The proposed energy storage value streams and the associated metrics were presented in five categories as follows:

1. Environmental and public health metrics
2. Distribution grid value
3. Peak demand reduction
4. PJM market activities
5. Distribution service improvements

It was expected that the EDCs would adopt the valuation methodologies proposed by PC44 Working Group. However, the PC44 Working Group did not anticipate that each project application would have quantified values for each of the identified value streams.

On April 15, 2020 the State's four investor-owned electric utilities each submitted applications for two energy storage projects (8 total projects). Table 1 lists each of the proposed energy storage projects by EDC, including the power and energy capacities of each storage project and which of the four ownership/operation models applies to the proposed project.

Table 1. Summary of utility storage proposals' capacity, energy, and ownership model

Utility/Project	Capacity (MW)	Annual Energy (MWh)	Ownership/Operation Model
Potomac			
Town Hill	1.75	8.4	Model 3: Third-Party Owned and Third-Party Operated
Little Orleans	0.75	5.1	Model 1: Utility Owned and Utility Operated
BGE			
Fairhaven	2.5	7.1/4.0^	Model 1: Utility Owned and Utility Operated
Chesapeake	1	2.0/1.5^	Model 3: Third-Party Owned and Third-Party Operated
DPL			
Elk Neck	0.5	2.2/1.5^	Model 4: Virtual Power Plant
Ocean City	1	3.6/3.0^	Model 1: Utility Owned and Utility Operated
Pepco			
National Harbor	1	4.3/3.0^	Model 2: Utility Owned and Third-Party Operated
Montgomery County Electric Bus Depot	1	4.3/3.0^	Model 3: Third-Party Owned and Third-Party Operated

^Initial usable capacity/Guaranteed end of life usable energy storage capacity.

Table 2 provides brief descriptions for each of the proposed energy storage projects.

Table 2. Brief energy storage pilot project descriptions

Location	Brief Project Description
Potomac	
Town Hill	The 1.75 MW lithium nickel manganese cobalt oxide battery energy storage system will be deployed on the Town Hill circuit, which in recent years has been a poor performing feeder due to an increase in tree-related outages. The battery solution will offer islanding capabilities to serve local load during outage events, avoiding the need to build a connection to another circuit and the installation of new technology to create an automated circuit loop. Potomac has the right to reserve the system for up to 20 days during each calendar year. During other times, the third-party owner and operator will provide PJM market services.
Little Orleans	The 0.75 MW lithium nickel manganese cobalt oxide battery energy storage system will be deployed along a single-phase portion of the Little Orleans circuit, which in recent years has been a poor performing feeder due to an increase in tree-related outages. The battery solution will offer islanding capabilities to serve local load during outage events, avoiding the need to build a connection to another circuit and the installation of new technology to create an automated circuit loop. Although the project is utility-owned, PJM market participation will be the responsibility of a third party. The Little Orleans project will be operated in a similar manner to the Town Hill project.
BGE	
Fairhaven	The two BGE energy storage projects combined seek to avoid a winter post-contingency overload of up to 3.5 MW. A traditional solution would require the possibly of undergrounding approximately 10 miles of one of the Marriott Hill circuits to separate the 34kV circuits on the shared pole-line. This Fairhaven project is a 2.5 MW lithium ion battery system sited at the Fairhaven substation in Southern Anne Arundel County to solve a 2.5 MW/4.0 MWh constraint. The primary application is for

Location	Brief Project Description
	grid reliability and distribution infrastructure avoidance and the secondary application is to provide PJM market services.
Chesapeake	The second BGE project is a third-party owned and operated project that, when operated in coordination with the Fairhaven project, would address the winter post-contingency overload issue. BGE will pay for grid reliability service through a 10-year performance-based contract. The system will include a single lithium ion battery energy storage system that solves a 1.0 MW/1.5 MWh (Tesla MegaPack) capacity constraint. The primary application is for grid reliability and distribution infrastructure avoidance and the secondary application is to provide PJM market services, specifically frequency regulation and energy arbitrage.
DPL	
Elk Neck	The Elk Neck project is proposed as a third-party owned and operated virtual power plant with distributed behind-the-meter systems aggregated to achieve a total resource of 0.5 MW capacity with 1.5 MWh of energy. The goal is to recruit 110 residential customers into the program from the Elk Neck area. Each host customer will receive free installation of a LG Electronics 5kW/19.6 kWh lithium ion battery and its use during periods when battery is not being used for grid services. The virtual power plant is expected to provide benefits to DPL and the host customers. For DPL, this includes peak shaving during periods of high load or load reduction/load injection capability during emergency grid conditions in the Elk Neck area and voltage or volt-ampere reactive ("VAR") support to the grid when needed. The application also references the potential to participate in PJM wholesale markets and accommodate greater amounts of distributed energy resources on the local circuit. Host customers can realize various benefits that include backup power during grid outages, increase solar self-consumption, and electric bill management under dynamic or time-of-use pricing programs.
Ocean City	The 1 MW nickel manganese cobalt lithium ion battery system is being proposed as a utility owned and operated system. The primary application identified by DPL is for peak shaving in the capacity constrained area during periods of high winter or summer load and during emergency grid conditions. This will reduce the thermal stress on distribution equipment, thereby extending the equipment's service life. DPL also highlights resilience benefits as availability of the energy storage system during outage events may reduce the length of time for outage restoration in the area by allowing the Automatic Sectionalizing and Restoration scheme to operate at higher customer loading levels than the existing level. The secondary use of the battery system will be providing PJM grid services.[1]
Pepco	
National Harbor	The 1 MW lithium iron phosphate battery system is proposed as a utility owned and third-party operated system to help defer the construction of a future distribution substation. Pepco is forecasting that the existing Livingston Road substation is expected to have a 1 percent overload in 2027 and a 2 percent overload in 2028. The

[1] DPL and the other utility applications failed to fully address the timing and technical requirements for a BESS to provide multiple grid and customer services. The concept of "value stacking" for energy storage resources is well understood, including the need to algin the operational capabilities of a BESS with the technical requirements of the services being offered. For more on this topic please see Hledik, R. Lueken, R., McIntyre, C., and Bishop, H. September 2017. Stacked Benefits: Comprehensively Valuing Battery Storage in California. Prepared by the Brattle Group for Eos Energy Storage. Available at http://files.brattle.com/files/7208_stacked_benefits_-_final_report.pdf.

Location	Brief Project Description
	primary use is for peak shaving to defer the substation upgrade and enhance grid reliability. The battery system is expected to provide three hours of peak shaving capability to Pepco during periods of high load or emergency grid conditions in the National Harbor area. The secondary use is to provide PJM market services. The third-party operator will share revenues from PJM market activities above $100,000 annually based on 40 percent to Pepco and 60 percent to the third-party operator.
Montgomery County Electric Bus Depot	The 1 MW nickel metal chloride lithium-ion is proposed as a behind-the-meter third-party owned and operated system. The installation at the planned Montgomery County electric bus depot in Silver Spring provides an opportunity to help defer or avoid a feeder upgrade that will be necessary to serve the additional load resulting from electric bus charging. Resilience benefits include support for bus charging during distribution system outage events and to potentially be recharged by a proposed solar array to be installed at the location creating a renewable microgrid opportunity.

Sources: Joint Exelon Utilities. April 2020. Application of Joint Exelon Utilities for Approval of Energy Storage Pilot Projects, Case No. 9619. Available at https://webapp.psc.state.md.us/newIntranet/Maillog/content.cfm?filepath=//Coldfusion/Admin%20Filings/200000-249999/229744/JointExelonUtilitiesStorageFiling(04152020)_F.pdf. and Potomac Edison. April 2020. Before the Public Service Commission of Maryland In the Matter of the Maryland Energy Storage Pilot Program, Case No. 9619. Available at https://webapp.psc.state.md.us/newIntranet/Maillog/content.cfm?filepath=//Coldfusion/Casenum/Admin%20Filings/200000-249999/230175/PSC9619-EnergyStoragePilot-PPRPPetitiontoIntervene-5.8.20.pdf.

2. OVERALL APPROACH & RECOMMENDATIONS

This section describes our overall approach to evaluating eight battery energy storage system (BESS) applications submitted by the four regulated electric distribution companies in compliance with the Energy Storage Pilot Project Act. In addition, Synapse presents our findings, recommendations, and overall conclusions based on our review and analysis of the utility storage project applications and responses to discovery questions.

2.1. Economic and ratemaking analysis

We reviewed the cost-effectiveness analysis for each energy storage project being proposed. This included a review of calculation and methods, whether proposed metrics and value streams adhere to those proposed by the PC44 Working Group, whether costs are reasonable, and any proposed qualitative benefits. Table 3 provides a summary of each project's cost and benefits and the associated benefit-cost ratio. The details of the analysis are presented in Section 3.

Table 3. Summary of utility reported benefit-cost analysis of energy storage project proposals

	Capacity MW	Energy MWh	Total Benefits	Total Costs	BCA
Potomac					
Town Hill	1.75	8.4	$1,523,435	$5,550,000	0.27
Little Orleans	0.75	5.1	$2,621,610	$2,910,000	0.90
BGE					
Fairhaven	2.5	7.1/4.0^	$16,279,000*	$12,515,000*#	1.30
Chesapeake	1	2.0/1.5^	$5,009,000*	$2,533,000*#	1.98
DPL					
Elk Neck	0.5	2.2/1.5^	$1,179,000*	$3,983,000*#	0.30
Ocean City	1	3.6/3.0^	$2,644,000*	$5,842,000*#	0.45
Pepco					
National Harbor	1	4.3/3.0^	$11,046,000*	$4,739,000*#	2.33
Montgomery County Electric Bus Depot	1	4.3/3.0^	$4,794,000*	$2,467,000*#	1.94

**Present value dollars.*

#Revenue requirements.

^Initial usable capacity / Guaranteed end of life usable energy storage capacity.

2.2. Emissions impact assessment

Battery storage consumes more energy than it provides

Any energy storage technology operates by taking in energy (either in the form of heat or electricity) and retaining it until a later time when that energy is needed. As a result, energy storage is a critical technology that can support the integration of intermittent renewable energy resources, such as solar and wind, while maintaining grid reliability.

Due to the laws of physics, there will always be energy losses associated with the process of "absorbing" and "releasing" the energy. The term "round-trip efficiency" (RTE) describes how much energy is lost during this process. For example, a storage technology with an RTE of 90 percent will need to charge 100 MWh in order to later discharge 90 MWh of energy. Battery storage—the storage technology type proposed by all four utilities in this proceeding—typically has an RTE of between 70 and 90 percent.[2] Because energy storage systems are associated with a net loss in energy, it is difficult for them to yield a net decrease in grid emissions unless one of these three criteria are met:

1) The storage technology is paired and charged primarily by a renewable energy source, like solar PV or wind. Only one utility proposal (Montgomery County Bus Depot) is committed to connect and charge the BESS with solar PV.

[2] Energy Storage Technology and Cost Characterization Report. 2019. U.S. Department of Energy. Available at: https://www.energy.gov/sites/prod/files/2019/07/f65/Storage%20Cost%20and%20Performance%20Characterization%20Report_Final.pdf

2) The percentage difference in marginal emissions between the hours the storage technology is charging, and discharging is *greater than* the RTE of the storage. In other words, for a battery with an RTE of 90 percent to yield a net reduction in emissions, the hour in which the battery charges must have a marginal emissions rate that is 10 percent lower than the hour in which it discharges.

3) The operator of the energy storage system purchases sufficient Tier I Renewable Energy Credits (RECs) annually to "supply" renewable energy for the energy storage technology. Note that the operator would need to purchase sufficient RECs to cover the RTE losses of the storage (i.e., if the storage has a RTE of 90 percent, the operator would need to purchase 100 RECs to be able to discharge 90 MWh of emissions-free energy).[3]

Table 4 illustrates that, for PJM in 2018, there were only three months in which the marginal emissions delta between on-peak and off-peak hours was greater than 10 percent (July, September, and October). That table also illustrates that there were three months in 2018 in which the marginal emissions delta was *negative* (January, March, and December). A negative marginal emissions delta indicates that, on average, the off-peak hours had higher marginal emissions rates than on-peak hours in that month.[4]

Energy storage technologies are typically operated for peak shaving or energy arbitrage. As illustrated by a 2017 journal article from *Nature Energy*, the operation of a battery for peak shaving or energy arbitrage does not necessarily align with charging during low emissions hours and discharging at high emissions hours.[5] Therefore, it is unlikely that a storage technology is always charging and discharging in a manner that has a net reduction in emissions. For the reasons above, energy storage technology is much more likely to have a net reduction in emissions if it is paired with and charged primarily by a renewable energy source (bullet #1 above).

[3] A REC represents 1 MWh of electricity. In Maryland, Tier 1 RECs include solar, wind, qualifying biomass, landfill methane, geothermal, ocean, fuel cell (charged by a Tier 1 resource), hydroelectric (under 30 MW), poultry litter-to-energy, waste-to-energy, and refuse-derived fuel. Note that several of these resources have associated emissions. Therefore, if the goal is to offset emissions using RECs the purchaser should acquire in-region (in this case, within the Mid-Atlantic region of PJM) RECs with minimal associated emissions.

[4] PJM 2014-2018 CO2, SO2, and NOx Emissions Rates. 2019. PJM. Page 4. Available at: https://www.pjm.com/-/media/library/reports-notices/special-reports/2018/2018-emissions-report.ashx?la=en

[5] Fares, R., Webber, M. The impacts of storing solar energy in the home to reduce reliance on the utility. Nature Energy 2, 17001 (2017). https://doi.org/10.1038/nenergy.2017.1

Table 4. Monthly marginal emissions rates for PJM in 2018 (lbs. CO_2/MWh)

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Annual
Marginal On-Peak	1,319	1,362	1,334	1,394	1,251	1,350	1,454	1,407	360	1,397	1,215	1,199	1,338
Marginal Off-Peak	1,328	1,285	1,344	1,302	1,160	1,232	1,302	1,335	1,216	1,219	1,124	1,202	1,254
Delta	-9	77	-10	92	91	118	152	72	144	178	91	-3	84
% Delta	-0.7%	5.7%	-0.7%	6.6%	7.3%	8.7%	10.5%	5.1%	10.6%	12.7%	7.5%	-0.3%	6.3%

Source: PJM 2014-2018 CO_2, SO_2, and NO_x Emissions Rates.

The PC44 Working Group air emissions reduction value should be refined in two ways

The PC44 Energy Storage Working Group advised the utilities involved in this proceeding to assume that, for every hour of energy "shifted" from an on-peak hour to an off-peak hour, a BESS would yield an average reduction of 84 pounds of carbon dioxide (CO_2) per MWh. This value is derived from PJM's 2018 annual marginal emissions delta (see Table 4). The Working Group advised the utilities to apply that CO_2 reduction value by multiplying it by the energy capacity of the battery, adjusted for RTE losses. For example, a 1 MW/4 MWh battery with an RTE of 85 percent that is fully discharged would have a CO_2 reduction of 4 MWh * 0.85 * 84 lbs. CO_2/MWh = 285.6 lbs. CO_2.

This approach requires refinement in two primary ways:

1) First, the Working Group suggested the use of an *annual* marginal emissions delta, rather than a more granular approach (i.e., monthly or hourly). As shown in Table 4, the marginal emissions deltas vary substantially from month to month, and are sometimes negative. For example, a BESS operated in the months of September and October are likely to have a different emissions impact than a BESS operated primarily in December and January. For this reason, a precise measurement of air emissions reduction value requires monthly marginal emissions rates based on the expected months of operation of the BESS. Hourly emissions rates are even more accurate, but that calculation would require detailed modeling. Given that the utilities only have a general sense of which months of the year their batteries are likely to discharge (rather than the exact hours of the year), applying historical monthly emissions deltas would have provided sufficient granularity and accuracy.

2) Second, the Working Group's report does not address the emissions associated with RTE losses in the calculation of the CO_2 reduction. The formula described above only addresses the energy that is "shifted" from one hour to another. In the example above, there are emissions associated with the "lost" 0.6 MWh of energy, regardless of the hour in which the BESS charges. As a result, all the utilities have under-represented the emissions impacts of their systems.

Storage emissions should ideally be evaluated on an hourly basis

In order to more precisely estimate the emissions impact of the eight utility BESS proposals, we utilized a model developed by Synapse Energy Economics on behalf of the U.S. Environmental Protection

Agency, called the AVoided Emissions and GeneRation Tool (AVERT). This tool uses historical hourly marginal emissions data from the most recent year (in this case, 2019) to estimate the emissions impacts of adding storage, renewables, or energy efficiency to the grid.[6] AVERT is an appropriate tool to use in evaluating these utility storage proposals because it not only evaluates marginal emissions on an hourly basis, but it also accounts for the emissions associated with the battery's RTE losses.

We developed hourly battery charge and discharge profiles (modeled as hourly positive and negative generation values within AVERT) for each utility BESS proposal based on the utility applications and discovery responses to quantify the annual emissions impact on an hourly basis. As will be described in the sections below, six BESS proposals are expected to yield a net *increase* in emissions, one BESS is expected to have a negligible impact on emissions (Elk Neck), and one BESS is expected to yield a net decrease in emissions (Montgomery County Bus Depot). Note that we have not re-calculated the dollar value of air emissions and public health impacts in these comments.

Battery projects should be paired with renewables for near-term environmental benefits

In the future, when there are more renewable energy resources on the margin in PJM, batteries that are not directly paired with a renewable energy resource will likely provide a net emissions benefit. To ensure that the batteries in the utility proposals provide an emissions benefit in the near term, the utilities should consider pairing and charging the batteries with a renewable energy resource, such as solar PV. Operating these utility pilot BESSs as proposed will have a relatively small negative environmental impact in the near term, but the learnings gained may help to encourage future energy storage deployments that yield net emissions benefits in alignment with Maryland's clean energy goals.

2.3. Wholesale market issues

The PC44 Energy Storage Working Group recognized the potential for energy storage projects to receive revenue through PJM market activities. The Working Group identified the range of wholesale market services energy storage systems can provide, including black start, capacity, demand response, emergency operations, energy arbitrage, regulation, and reserves.

However, the integration of BESS in wholesale power markets is in the early stages. Within PJM there are over 5 GW of energy storage resources (ESR). The vast majority (~95 percent) is in the form of pumped hydro storage. Battery storage installations within PJM are equal to approximately 300 MW.[7] While PJM has been one of the leading regional transmission organizations (RTOs) supporting the integration of ESRs into wholesale power markets, unresolved issues remain.

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[6] AVoided Emissions and GeneRation Tool (AVERT). U.S. Environmental Protection Agency. 2020. Open source tool available at: https://www.epa.gov/statelocalenergy/avoided-emissions-and-generation-tool-avert.

[7] Andrew Levitt. October 2019. Energy Storage Deployment in PJM. Available at https://www.energy.gov/sites/prod/files/2019/10/f68/EAC_Storage_Levitt.pdf.

In October 2019, the Federal Energy Regulatory Commission (FERC) approved PJM's compliance filing in response to FERC's historic Order 841,[8] which requires RTOs and Independent System Operators (ISOs) to create market rules that allow for the full participation of ESRs in wholesale power markets. While PJM was given approval to implement its proposed market rule changes to further support the integration of ESRs in wholesale power markets, FERC initiated a separate hearing on PJM's proposed 10-hour duration requirement to qualify ESR for participation in PJM's capacity market. PJM asked FERC to hold in abeyance its proceeding establishing minimum-run time requirements for all resources until early 2021 so it could explore fundamental reforms to its capacity market.

PJM implemented its Energy Storage Resource Participation Model in December of 2019 based on its FERC-approved 841 compliance filing. PJM's ESR participation model is described in Section 2.3.4B of PJM Manual 11, Energy & Ancillary Services Market Operations Revision: 108, Effective Date: December 3, 2019. The ESR energy participation model is optional, allowing ESRs to schedule their operation into PJM markets. ESR model participants are not optimized for commitment decisions in day-ahead and real-time because they are managed directly by participants through specification of the four modes of operation for each operating hour. The four modes of operation are: continuous mode, charge mode, discharge mode, and unavailable. ESR operators must submit operation modes on an hourly basis through Markets Gateway by 11:00 am the day before the operating day for Day-Ahead and 65 minutes before the operating hour for Real-Time.[9] Additional PJM manuals establish the eligibility criteria and performance standards for ESRs participating in PJM's wholesale markets.

Most of the utility pilot energy storage projects included PJM market revenues in their benefit cost analysis. Table 5 lists each storage project along with the utility estimates of PJM market participation revenues. Five of the eight energy storage project applications included revenues from PJM's frequency response regulation market. Three storage applications included revenue projections from other PJM markets, notably providing reserves and engaging in energy arbitrage. The assessment of projected PJM market activities revenues is integrated into the economic and ratemaking analysis.

[8] Enacted in February 2018, Order No. 841 addresses the participation of electric storage resources in the capacity, energy, and ancillary service markets operated by organized wholesale power markets to more effectively integrate electric storage resources, enhance competition, and help ensure that those markets produce just and reasonable rates. The rule requires each organized power market to revise its tariff to establish a participation model consisting of market rules that recognize the physical and operational characteristics of electric storage resources and facilitate their participation in those markets. Available at https://ferc.gov/media/news-releases/2019/2019-4/10-17-19-E-1.asp#.XrVOmahKiUl.

[9] PJM. December 2019. Manual 11, Energy & Ancillary Services Market Operations Revision: 108. Available at https://www.pjm.com/~/media/documents/manuals/m11.ashx.

Table 5. Utility estimates of project life PJM revenues by energy storage project

	Capacity MW	PJM Regulation Market Revenues		Other PJM Market Revenues	
Potomac		**PV**	**Total**	**PV**	**Total**
Town Hill	1.75	n/a	$31,190	n/a	$778,420
Little Orleans	0.75	n/a	n/a	n/a	n/a
BGE					
Fairhaven	2.5	$2,387,000	$5,923,000	n/a	n/a
Chesapeake	1	n/a	n/a	n/a	n/a
DPL					
Elk Neck	0.5	$528,000	$930,000	$85,000	$150,000
Ocean City	1	$1,302,000	$2,130,000	$210,000	$344,000
Pepco					
National Harbor	1	$224,000	$390,000	n/a	n/a
Montgomery County Electric Bus Depot	1	n/a	n/a	n/a	n/a

Notes: Potomac uses a 10-year project timeline and the Exelon utilities use 15 years. Other PJM market revenues for Potomac are reserves and for the Exelon utilities it refers to energy arbitrage.

A scan of Table 5 illustrates some obvious disparities. Potomac Edison's Town Hill project estimates total PJM market revenues from participation in PJM's frequency regulation market of $31,190 and revenues of $778,420 from providing reserves. DPL's Ocean City project has the same 1 MW rating yet forecasts total revenues of $2,130,000 from participation in PJM's frequency market. The large disparity in revenues from the regulation market is that Potomac Edison anticipates that the Town Hill project will only be participating in the regulation market 10 percent of the time. It is unclear from Potomac Edison's application why they prioritized participation in PJM's reserves market over participation in the frequency regulation markets. Revenue projections for participation in PJM's regulation market for the National Harbor project are approximately one-third of those for the Ocean City project, both of which are 1 MW resources and use a 15-year time horizon.

Based on a review of the utility filings and response to discovery questions, we arrived at the following conclusions related to wholesale market issues:

1. There are significant risks associated with PJM market revenue projections.

    a. Total "active" energy storage projects in PJM queue is 15.7 GW. Increasing penetration of energy storage systems in PJM's wholesale energy markets will impact future prices.

    b. PJM's regulation market could become saturated depressing market prices. PJM's hourly demand for frequency regulation is between 525 MW and 800 MW. Given existing energy storage resources and those already in PJM's interconnection queue, it

is very likely that prices for regulation will decline as more and more energy storage projects seek to participate in this market.[10]

2. Energy storage systems must conform with PJM's technical specifications and performance standards for participation in its wholesale energy markets.

    a. Energy storage systems participating in PJM's wholesale energy markets must meet the technical specifications and performance standards as outlined in the relevant PJM manuals.

    b. Utility energy storage pilot projects fail to demonstrate that the systems will meet the technical specifications and performance standards to participate in PJM's wholesale energy markets.

3. Electric distribution utilities fail to identify the incremental project costs necessary to participate in PJM wholesale markets.

    a. The additional costs of telemetry, metering, etc. to participate in PJM's wholesale energy markets should be explicit to determine whether these incremental costs are justified by the potential PJM wholesale market revenues.

    b. For third-party operator models, the value of PJM market revenues should be transparent in how it is factored into the service contract.

2.4. Overall recommendations

In this section we provide our overall recommendations based on our research and analysis of the utility filings, and responses to discovery questions presented in Section 3. We provide more detailed recommendations for each utility and pilot energy storage project in Section 3 below.

- Recommendations across the utilities:
    - Utilities should conduct sensitivity analysis of wholesale market prices used to develop projected revenues from PJM wholesale market activities. The Regulation D[11] (RegD) market has been an attractive market opportunity for BESS systems given the high market values and the ability for BESS to respond accurately and quickly to the RegD signal. However, as additional BESS are deployed in PJM, it is likely that this market will become saturated and wholesale market prices will decline.

[10] Utility Dive. November 2019. New battery storage on shaky ground in ancillary service markets. Available at https://www.utilitydive.com/news/new-battery-storage-on-shaky-ground-in-ancillary-service-markets/567303/.

[11] The Regulation D is a unique opportunity in PJM to allow fast-responding resources to be compensated based on their ability to quickly and accurately respond to signals from PJM to correct Area Control Error (ACE).

- Utilities should demonstrate that the proposed BESS projects meet the technical specifications and performance standards for participation in PJM's wholesale markets. Furthermore, utilities should identify the incremental costs for telemetry, metering, etc. to participate in PJM markets. These incremental costs should be justified based on a comparison with the projected market revenues.

- Projections of PJM market revenues for third-party owned and operated systems should be transparent. Utilities should explicitly describe how wholesale market revenues for third-party owners and operators are reflected in the contract prices.

- We recommend that each utility recalculate its emissions and public health impacts using an updated methodology that includes the RTE losses and employs *monthly* average marginal emissions rates instead of annual average marginal emissions rates.

- We recommend that the Energy Storage Pilot Program reporting requirement encourage efforts to quantify more of the unquantified benefits that were identified in each utility energy storage project application to maximize the learnings from the program.

- Potomac Edison:

  - Potomac Edison's BESS proposals contain multiple errors that need to be addressed.

  - When we correct for the errors in Potomac Edison's BCA, we find both the Town Hill and Little Orleans projects to have extremely low benefit-cost ratios. Since these two projects seek to address the same type of reliability issue, we recommend only one project be approved. The Town Hill project is proposed to be third-party owned and operated, therefore it will provide fewer learnings to Potomac Edison. For this reason, we recommend that the Commission not approve Town Hill.

- Joint Exelon Utilities:

  - We support the approval of all BESS proposals submitted by the Joint Exelon Utilities with modifications.

    - Elk Neck: If this proposal is approved, DPL should coordinate this pilot with its other customer offerings that have the potential to be integrated with the Sunverge platform to take full advantage of that investment and maximize benefits to customers. DPL should assess customer interest in in pairing new or existing solar PV systems with BESS to realize the increased benefits of reduced emissions and additional learnings.

    - Fairhaven, Ocean City, and National Harbor: We find that the costs of these projects to be higher than industry averages. This may be due in part to the large percentage of costs related to contingencies.

Considering the Exelon Utilities' limited experience with projects of this kind, Synapse agrees with Exelon's inclusion of contingency costs for the purposes of performing a cost-benefit analysis for these future projects. However, to the extent BGE or any other Exelon EDC includes the projected costs of energy storage projects in the calculation of a revenue requirement in a multi-year rate plan, the inclusion of contingency costs may not be appropriate.

3. RESEARCH AND ANALYSIS

3.1. Potomac Edison: Town Hill and Little Orleans Projects

Assessment of benefits and costs

Potomac Edison proposes two projects, Town Hill and Little Orleans, each with the primary objective of enhancing reliability on poor performing feeders due to increases in tree-related outages. Based on the benefit-cost analysis conducted by Potomac Edison, neither project is cost-effective. Town Hill has a benefit-cost ratio (BCR) of 0.27 and Little Orleans has a BCR of 0.90.

While Synapse understands there is no requirement for cost-effectiveness, and that the main purpose of the BESS pilot projects are to test business models and evaluate value streams, there are significant flaws in Potomac Edison's BCA that brings into doubt whether these proposed pilots are in the best interest of ratepayers.

Several quantitative benefits are incorrect

1. <u>The Benefits of Energy Conservation During Time of Peak is overstated</u>

   The PC 44 Working Group proposes that utilities use EmPOWER assumed values for peak versus non-peak energy.[12] Potomac Edison did not use EmPOWER data and instead uses one-year (2019) of PJM locational marginal pricing (LMP) data to support an unreasonably high peak price of $0.10 per kWh and an unreasonably low off-peak price of $0.02 per kWh. The use of a higher peak price and lower off-peak price compared to EmPOWER inflates these benefits. Potomac Edison does not provide justification as to why it chose these values instead of EmPOWER. Further, Potomac Edison does not account for whether these prices may change over the course of the BESS project. It instead holds a constant value across the entire project lifetime, without even accounting for inflation. Furthermore, Potomac Edison neglected to take the present value of the stream of annual energy conservation values.

[12] PC44 Energy Storage Working Group Filing on Value Streams, Case No. 9619, December 31, 2019, at pg.9.

In Table 6 and

Table 7 below, we recreate Potomac Edison's calculations using summer on-peak and off-peak values for Potomac Edison from the most recent EmPOWER Avoided Cost Model for 2021-2023 Program Planning. When the EmPOWER values are used, over the life of the proposed project, Town Hill's energy conversation benefits are overstated by $112,682 and Little Orleans' benefits are overstated by $68,484.

Table 6. Town Hill energy conservation during time of peak

Potomac Edison Analysis												
Year	**1**	**2**	**3**	**4**	**5**	**6**	**7**	**8**	**9**	**10**	**Total**	**NPV**
Conservation at Peak	$13,067	$13,067	$13,067	$13,067	$13,067	$13,067	$13,067	$13,067	$13,067	$13,067	$130,667	$91,142
Synapse Analysis												
Year	1	2	3	4	5	6	7	8	9	10	Total	NPV
Peak Savings	$511	$546	$575	$560	$443	$450	$457	$463	$470	$477	$4,952	$3,495
Off-Peak Costs	$419	$461	$501	$483	$351	$357	$362	$367	$373	$378	$4,052	$2,875
Net Savings	$91	$85	$73	$77	$92	$93	$95	$96	$97	$99	$899	$620
Net Savings at 20 Cycles/Year	$1,827	$1,707	$1,465	$1,539	$1,839	$1,866	$1,893	$1,921	$1,950	$1,978	$17,985	$12,397
Difference	$11,239	$11,360	$11,601	$11,528	$11,228	$11,201	$11,173	$11,145	$11,117	$11,088	$112,682	$78,745

Table 7. Little Orleans energy conservation during time of peak

Potomac Edison Analysis												
Year	**1**	**2**	**3**	**4**	**5**	**6**	**7**	**8**	**9**	**10**	**Total**	**NPV**
Conservation at Peak	$7,933	$7,933	$7,933	$7,933	$7,933	$7,933	$7,933	$7,933	$7,933	$7,933	$79,333	$55,336
Synapse Analysis												
Year	**1**	**2**	**3**	**4**	**5**	**6**	**7**	**8**	**9**	**10**	**Total**	**NPV**
Peak Savings	$310	$331	$349	$340	$269	$273	$277	$281	$285	$290	$3,006	$2,122
Off-Peak Costs	$255	$280	$304	$293	$213	$217	$220	$223	$226	$230	$2,460	$1,746
Net Savings	$55	$52	$44	$47	$56	$57	$57	$58	$59	$60	$546	$376
Net Savings at 20 Cycles per Year	$1,109	$1,036	$890	$934	$1,116	$1,133	$1,150	$1,166	$1,184	$1,201	$10,920	$7,527
Difference	**$6,824**	**$6,897**	**$7,044**	**$6,999**	**$6,817**	**$6,801**	**$6,784**	**$6,767**	**$6,750**	**$6,732**	**$68,414**	**$47,809**

2. Deferral value is incorrect

While the stated purpose of both the Town Hill and Little Orleans BESS projects is reliability, the non-wires alternative (NWA) or deferral value is the largest quantified benefit for each project, as detailed in Potomac Edison's filed Cost-Benefit Tables included in Appendices C and F respectively. Specifically, the Town Hill BESS project seeks to defer the construction of

approximately 7,000 feet of new distribution line and reconductoring over five miles of existing line at a cost of $1.7 million. The Little Orleans BESS projects seeks to defer the construction of approximately 6,000 feet of new underground distribution line and reconductoring over four miles of existing line at a cost of $1.2 million

However, when asked in what year these traditional distribution projects would be built, Potomac Edison states, "The exact timing of an alternative project has not been determined."[13] This brings into question whether there is a true deferral value. If Potomac Edison does not yet know in what year the traditional distribution projects would be built, it is unclear if these projects are truly needed. Further, if the timing of these projects is not currently known, it is unlikely any deferral value could be claimed in the first two years of the pilot. For instance, if the traditional project were to be deferred by the BESS in 2021 or 2022, one would assume that Potomac Edison would already know the construction date for the traditional project. Lastly, this brings into question the accuracy of the Town Hill and Little Orleans Distribution Revenue Requirements calculations included in the Avoided Distribution tabs of Staff 2.1 Attachment A and Attachment B respectively.[14] In these workbooks, Potomac Edison bases the revenue requirements on the assumption that the traditional distribution investment begins in January of 2022 for each project. If the Company doesn't know the start date it is unclear why it chose to model these requirements beginning in that year.

We recommend that the deferral value not be included as a value stream for either project due to the fact Potomac Edison has not indicated that the traditional distribution project would have been built in the absence of the BESS projects.

If Potomac Edison can justify that the BESS creates a true deferral, it should still be noted that there are errors in Potomac Edison's calculation of its deferral value for both projects, which leads to an undervaluation of the deferral benefit in each project.

a. The deferral value in Potomac Edison's filing does not consider the full revenue requirements, including depreciation. The Company should use the net-present value of the deferred projects full revenue requirements as provided in its Avoided Distribution tabs of Staff 2.1 Attachment A and Attachment B.[15] Specifically, for Town Hill this would be the NPV of the 10-year deferral value of $1,468,682 instead of the cumulative value of $791,287 included in the filing. For Little Orleans, this would be the NPV of the 10-year deferral value of $1,047,832, instead of the cumulative value of $564,544.

[13] Case No. 9619 OPC DR 1-2 and 1-28.

[14] Case No. 9619 Staff DR 2.1 Attachment A (Town Hill) and Staff 2.1 Attachment B (Little Orleans).

[15] Case No. 9619 Staff DR 2.1 Attachment A (Town Hill) and Staff 2.1 Attachment B (Little Orleans).

b. Potomac Edison's filing details that both property taxes and O&M expenses are included in the deferral calculation.[16] However, after examining the Avoided Distribution tabs of Staff 2.1 Attachment A and Attachment B,[17] it is clear that the property taxes are not included in the deferral value used in the original filing for either project. If the correct deferral values discussed in paragraph (a) above are applied, it would correct for this issue.

c. It is unclear why the Little Orleans project is counting residual value as a benefit.

3. Peak shaving Calculation is Incorrect

Potomac Edison performed its peak shaving value calculations incorrectly for both the Town Hill and Little Orleans projects. The peak shaving value used by PE of $1.5/kW-month leading to an undervaluing of the peak shaving benefit.

The most recent EmPOWER Avoided Cost Model for 2021-2023 Program Planning provides appropriate capacity values that represent the effect that a utility's overall peak demand has over time on each utility's PJM wholesale market Zonal Capacity Obligation and Transmission Obligation. We recommend these values be used in this assessment.

In Table 8 below, we recreate Potomac Edison's calculations using the capacity values for EmPOWER program year 2021 over the 10-year pilot term, discounting the stream of annual peak shaving benefits to present value using Potomac Edison's WACC of 7.15 percent as included in its proposal. Table 8 includes a comparison between our revised calculations applying the EmPOWER values and Potomac Edison's peak shaving benefits as presented in its application. Note we discounted the annual peak shaving values provided by Potomac Edison using the same 7.15 percent discount rate. Potomac Edison significantly undervalued the peak shaving value of the projects they are proposing for the Maryland pilot energy storage program.

Table 8. Peak shaving benefit comparison

		Town Hill	Little Orleans
EmPOWER Capacity Values $/MW-day	Total	$1,217,269	$521,687
	Present Value	$847,188	$363,081
$1.50/kW-month	Total*	$315,000	$135,000
	Present Value	$219,717	$94,164

**Values assigned to peak shaving in Potomac Edison's application.*

[16] Petition for Participation in Energy Storage Pilot Program of The Potomac Edison Company, Case No. 9619, at Exhibit C pg. 21 and Exhibit F. pg. 24.

[17] Case No. 9619 Staff DR 2.1 Attachment A (Town Hill) and Staff 2.1 Attachment B (Little Orleans).

4. PJM reserve market revenues estimate is incorrect

   PE used accurate historical market clearing prices for reserves but made a mistake in calculating the annual revenue potential. Specifically, PE incorrectly multiplied the BESS energy storage capacity (5.1 MWh) times the power rating (0.75 MW) prior to multiplying the capacity being offered by the annual hours providing reserves times the market clearing price. As reserves are a capacity resource, Potomac Edison overstates the MW of capacity the BESS can provide as a reserve resource. This error resulted in an overestimate of the revenues from participation in PJM's reserve market. We estimate the annual revenues to be $17,000 versus Potomac Edison's estimate of $77,840.

Qualitative benefits are overstated

For both BESS projects, Potomac Edison relies upon qualitative benefits and future advances as a justification for why the projects should be approved even though the costs outweigh the benefits. Specifically, Potomac Edison states that the benefits to which a dollar value cannot be ascribed at this time should more than outweigh the program costs.[18] However, it is unclear to what extent such qualitative benefits will be realized. For example, in the case of hosting capacity, Potomac Edison indicates there will be 2,212.5 kW of hosting capacity on the Town Hill circuit and 1,213 kW of hosting capacity on the Little Orleans circuit after the BESS projects are installed.[19] Given the fact Potomac Edison estimates that only 100 kW of new solar would be anticipated on each of the circuits over the next 10 years,[20] Therefore, it is unclear how the BESS will provide hosting capacity benefits when the existing available capacity is already much higher than what will be needed to accommodate anticipated future solar deployments.

Potomac Edison also indicates that the BESS projects can provide additional benefits if contracted to do so. These include as frequency regulation, voltage support, and hosting capacity augmentation. However, it remains unclear as to whether the BESS projects can be operated to support their proposed primary and secondary applications as well as these additional tertiary benefits. As noted above, the utilities should clearly demonstrate that the operation of the BESS is in line with the technical requirements to provide the anticipated services over time.

Lastly, on page 6 of its Application for the Town Hill project, Potomac Edison states, "The additional revenue allows the system owner and operator to offer Potomac Edison a lower annual contract price." However, Potomac Edison appears unable to provide any evidence to support this claim, stating that Convergent did not provide Potomac with the projected additional revenue it projects it will earn from

[18] Petition for Participation in Energy Storage Pilot Program of The Potomac Edison Company, Case No. 9619, at pgs. 9 and 14.

[19] Case No. 9619 Staff DR 4-7.

[20] Case No. 9619 OPC DR 1-10 and 1-35.

the PJM market.[21] We understand from the Company this information is confidential. However, it will be important to understand over the course of the Town Hill project how much PJM revenue Convergent received from this BESS. This information will be useful in assessing future contract costs and gaining a better understanding of forecasting future PJM revenues for this type of BESS system.

Revised benefit-cost analysis

To understand how the above corrections to Potomac Edison's analysis impact the overall BCR for each of Potomac Edison's proposed BESS pilots, Synapse recreated the BCA included in the Company's original filing. In the column labeled "Original Filing" in Table 9 and Table 10 below, the only change we made to the Company's original values was to discount the stream of costs and benefits to present value using Potomac Edison's WACC of 7.15 percent as included in its proposal. We made this correction to more easily compare against our revised BCA. It should be noted that taking the NPV of the costs and benefits changes the value of Potomac Edison's originally filed BCRs.

The columns labeled "Synapse Corrected BCA" in Table 9 and Table 10 below show corrected benefit streams for the errors we noted in the above section. These include the decrease in energy conservation at peak benefits, an increase in peak shaving benefits, corrected deferral values, which lead to an increase in benefits, and corrected PJM reserve market revenues, which lead to a decrease in benefits. While we do not support inclusion of the deferral benefit for these projects, we include it here to show the impact of its correction.

The tables below compare the NPV of Potomac Edison's original benefit-cost analysis to our corrected analysis. Compared to Potomac Edison's original filing, the corrected BCR for the Town Hill project is 0.273 without including the deferral, coincidentally almost the same BCR as Potomac Edison included in its filing of 0.274 (or taking the NPV shown below of 0.268). The corrected BCR without the deferral value for Little Orleans is 0.28, compared to the BCR Potomac Edison presented in its original filing of 0.90 (or taking the NPV shown below of 0.77).

[21] Case No. 9619 OPC DR 1-13.

Table 9. Synapse Corrected vs Potomac Edison filed benefit-cost table for Town Hill project

Town Hill BESS	Potomac Edison BCA	Synapse Corrected BCA	
	Original Filing (NPV)	With Deferral (NPV)	Without Deferral (NPV)
Costs			
BESS	$3,882,990	$3,882,990	$3,882,990
Benefits			
Air Emissions	$22,147	$22,147	$22,147
Health Benefits	$17,138	$17,138	$17,138
NWA Value	$530,816	$1,468,682	$0
Energy Conservation at Peak	$91,142	$12,397	$12,397
Peak Shaving	$219,717	$847,188	$847,188
Reliability	$160,540	$160,540	$160,540
Service Quality			
PJM Market Operations			
Capacity Avoidance			
Black Start Grid Value			
Total			
Total Costs	3,882,990	$3,882,990	$3,882,990
Total Benefits	1,041,500	$2,528,093	$1,059,410
Total Benefits less Costs	($2,841,490)	($1,354,898)	($2,823,580)
Project BCR	**0.268**	**0.651**	**0.273**

Table 10. Corrected vs Potomac Edison filed benefit-cost table for Little Orleans project

Little Orleans BESS	Potomac Edison BCA	Synapse Corrected BCA	
	Original Filing (NPV)	With Deferral (NPV)	Without Deferral (NPV)
Costs			
BESS	$2,567,292	$2,567,292	$2,567,292
Benefits			
Air Emissions	$13,447	$13,447	$13,447
Health Benefits	$10,405	$10,405	$10,405
NWA Value	$378,711	$1,047,832	$0
Energy Conservation at Peak	$55,336	$7,527	$7,527
Peak Shaving	$94,164	$363,081	$363,081
Reliability	$185,252	$185,252	$185,252
Residual Value	$684,399	$0	$0
PJM Market Operations			
Black Start Grid Value	$0	$0	$0
Regulation	$21,759	$21,759	$21,759
Reserves	$542,959	$118,577	$118,577
Total			
Total Costs	$2,567,292	$2,567,292	$2,567,292
Total Benefits	$1,986,432	$1,767,879	$720,047
Total Benefits less Costs	($580,860)	($799,413)	($1,847,244)
Project BCR	**0.77**	**0.69**	**0.28**

Environmental impacts assessment

The Town Hill and Little Orleans BESS proposals are both intended to address up to 20 tree- and weather-related outages per year in their respective locations. Further, they are both intended to charge during night hours (10pm-7am) and to discharge fully during the outage event. Potomac Edison states no intention of pairing either BESS with a renewable energy resource.

The Town Hill BESS is a 1.75 MW / 8.4 MWh battery with an RTE of 90 percent. The Little Orleans BESS is a 0.75 MW / 5.1 MWh battery with an RTE of 90 percent. Potomac Edison was unable to provide an anticipated charge-discharge profile for these two BESS projects. Therefore, we developed an approximate profile for a typical year of battery operation (8,760 hours) to input into the AVERT tool. The profiles were developed using summary statistics from OPC-1.14 Attachment A (Town Hill) and OPC-1.37 Attachment A (Little Orleans), a log of past tree- and weather-related outage events from the most recent five years. The statistics used to develop the profiles include median event duration, percentage of historical events that took place at night (10pm-7am), and percentage of outages that took place on weekdays and weekends (Table 4 and Table 11).

Table 11. Summary statistics utilized in developing charge/discharge profile for Town Hill BESS

	Number of Outages	% of Outages
Weekday	69	70%
Weekend	30	30%
Peak Weekday (7am-10pm)	54	55%
Off-Peak Weekday (10pm-7am)	15	15%
Weekend Daytime (7am-10pm)	25	25%
Weekend Night (10pm-7am)	5	5%
Winter	30	30%
Spring	34	34%
Summer	21	21%
Fall	14	14%
Duration Median (minutes)	349	-

Source: Potomac Edison Discovery OPC-1.14 Attachment A.

Table 12. Summary statistics utilized in developing charge/discharge profile for Little Orleans BESS

	Number of Outages	% of Outages
Weekday	33	63%
Weekend	19	37%
Peak Weekday (7am-10pm)	23	44%
Off-Peak Weekday (10pm-7am)	10	19%
Weekend Daytime (7am-10pm)	13	25%
Weekend Night (10pm-7am)	6	12%
Winter	18	35%
Spring	13	25%
Summer	9	17%
Fall	12	23%
Duration Median (minutes)	301	-

Source: Potomac Edison Discovery OPC-1.14 Attachment A.

Using the specifications of its proposed batteries and the methodology recommended by the PC44 Working Group, Potomac Edison calculates that the Town Hill BESS will *displace* 12.7 short tons of CO_2 per "cycle" and Little Orleans will *displace* 7.7 short tons of CO_2 per "cycle." However, Potomac Edison multiplied those values by 250 cycles, rather than the 20 cycles of peak-shifting stated in the utility's proposal (Potomac Edison filing pages 6 and 12). The methodology recommended by the PC44 working

group only applies to hours in which load is shifted from an on-peak hour to an off-peak hour. Not only is Potomac Edison inflating the number of cycles used per year, but the utility is also assuming that all the outage events associated with the Town Hill and Little Orleans BESS projects will be peak-shifting. This assumption is unlikely, given that weather- or tree-related outages have historically not always taken place during on-peak hours. The tables above illustrate that 20 to 27 percent of outages historically took place during off-peak night hours. Further, this type of outage can take place at any time year-round, yet high marginal emissions deltas tend to occur only during the summertime (Table 4). Finally, Potomac Edison's calculation omits any emissions associated with the RTE losses of the battery.

Evaluating these two BESS projects using the AVERT tool, we calculate that the Town Hill BESS is expected to have a net consumption in energy of 20 MWh annually, and the Little Orleans BESS is expected to have a net consumption in energy of 30 MWh annually.[22] Based on the hours when these batteries are expected to operate, Town Hill will have a net *increase* in emissions of 22 tons of CO_2 annually, and Little Orleans will have a net *increase* in emissions of 33 short tons of CO_2 annually.

Given the efficiency of the batteries and the expected operation schedule of the Town Hill and Little Orleans BESS projects, the only way to ensure the projects have a net reduction in emissions is to pair the batteries with a renewable energy source, such as solar PV, or for the utility to purchase sufficient Class I RECs to cover the annual energy consumption of the batteries.

Conclusions and recommendations

1. Town Hill

The proposed project has an extremely low BCR, that would be even lower if the modeled impacts of carbon emissions were considered. In addition, Potomac Edison did not provide significant justification for its qualitative benefits or how likely those benefits were to occur over the 10-year pilot. Further, the Town Hill project would examine a use case that is almost identical to that proposed in the Little Orleans project, but would likely provide fewer learnings to Potomac Edison since it would be third-party owned and operated. Absent the Town Hill project, Potomac Edison could still attain the desired learnings from the Little Orleans project. In fact, given the similarities between the two projects, it would provide for a better case study if after the 10-year pilot, Potomac Edison could examine the benefits of the BESS installed at Little Orleans and compare that to Town Hill where no BESS was installed.

[22] Note that AVERT reports results rounded to the nearest ten for precision reasons.

2. Little Orleans

When the proposal errors are corrected, the Little Orleans project has a low BCR similar to the Town Hill project. However, it has value as a pilot given the fact it will provide learnings to Potomac Edison and provide reliability benefits to customers.

We do have concerns with several aspects of the proposal that the Commission should consider requiring Potomac Edison to address. These include the various inaccuracies uncovered in the BCA and whether there are additional inaccuracies within the overall proposal. Furthermore, there are considerable inaccuracies with the utility's estimate of PJM market revenue which led to a significant decrease in the projected revenues and the overall BCR.

Lastly, we note that while Potomac Edison assessed the benefits of avoided emissions using the PC 44 Working Group proposed value streams, our evaluation of this project using the AVERT tool based on the hours the BESS is expected to operate showed Little Orleans having a net increase in emissions of 33 short tons of CO_2 annually.

3.2. BG&E: Fairhaven and Chesapeake Projects

Assessment of benefits and costs

We reviewed the benefits and costs associated with the Fairhaven and Chesapeake projects. We found that the methodology and assumptions are sound, and both BESS projects are cost-effective. However, the proposed capital costs for the Fairhaven project appear high compared to recent industry benchmarking studies. Lazard's Levelized Cost of Storage Analysis 5.0 evaluates recent BESS costs on the basis of nameplate energy and capacity. The Lazard analysis finds that, for front-of-the-meter battery storage used to defer a transmission or distribution need, nameplate energy costs range from $297 to $579/kWh, whereas the Fairhaven BESS has a cost of $1,938/kWh. For nameplate capacity costs, Lazard finds a range of $1,784 to $3,474/kW. The Fairhaven BESS is on the higher end with a nameplate capacity cost of $3,100/kW.[23]

Environmental impact assessment

The Fairhaven and Chesapeake Beach BESS proposals are both intended to address up to 10 winter peak events, and the batteries are intended to be operated in concert to address the 10 events in a manner that meets the needs of the circuit. BGE notes in Discovery Response OPC-2-2 and OPC 2-7 that the two BESSs will typically charge during nighttime hours before an anticipated reliability event (10pm-7am). Further, the Fairhaven battery has a discharge limitation of 71 percent, while the Chesapeake battery has no discharge limitations. BGE states no intention of pairing either BESS with renewable energy sources.

[23] Lazard's Levelized Cost of Storage Analysis 5.0, November 2019. Available at: https://www.lazard.com/media/451087/lazards-levelized-cost-of-storage-version-50-vf.pdf.

The Fairhaven BESS is a 2.5 MW / 7.1 MWh battery with an RTE of 87 percent and the Chesapeake BESS is a 1 MW / 1.5 MWh battery with an RTE of 87 percent. BGE was unable to provide an anticipated charge-discharge profile for these two BESS projects, Therefore, we developed an approximate profile for a typical year of battery operation (8,760 hours) to input into the AVERT tool. The profile was developed using information provided in Discovery Response OPC-2.11, which explained that there has only been one winter peak event in the past five years. That event took place around 6 am and had a duration of two hours. Our profile assumed that all 10 winter "peak" events took place at similar times and for similar durations.

Using the specifications of its proposed batteries and the methodology recommended by the PC44 Working Group, BGE calculates that the Fairhaven and Chesapeake batteries together will *displace* 2.7 short tons of CO_2 per year (MD 9619 Staff DR 1-21 Attachment A, Tab EPH 01). As mentioned above, its calculation omits any emissions associated with the RTE losses of the battery. Further, a battery that is discharged primarily in the winter is unlikely to provide net emissions benefits, given that winter marginal emissions deltas have historically been low or negative (Table 4).

Our analysis of these two BESS projects using the AVERT tool indicates that the Fairhaven and Chesapeake BESSs together are expected to have a net *consumption* in energy of 20 MWh annually.[24] Based on the hours when these batteries are expected to operate, the two batteries will have a net *increase* in emissions of 22 tons of CO_2 annually.

Given the efficiency of the batteries and the expected operation schedule of the Fairhaven and Chesapeake Beach BESS projects, the only way to ensure the projects have a net reduction in emissions is to pair the batteries with a renewable energy source, such as solar PV, or for the utility to purchase sufficient Class I RECs to cover the annual consumption of the battery.

Conclusions and recommendations

1. The Fairhaven and Chesapeake Projects are cost-effective. However, the Fairhaven projects' high costs relative to industry benchmarks is driven to a large degree by the high contingency costs contained in the proposal.
2. Significant risks exist for the PJM market revenue projections for the Fairhaven project.
3. BG&E should demonstrate that the Fairhaven and Chesapeake projects meet all technical specifications and performance standards for participation in PJM's wholesale markets.
4. BG&E should demonstrate that the PJM market revenues for the Chesapeake project to be gained by the third-party owner and operator are reflected in the contract price.

[24] Note that AVERT reports results rounded to the nearest ten for precision reasons.

5. While it does not impact the overall cost-effectiveness of the project, it is important to note that based on the hours when the proposed batteries are expected to operate, the two batteries will have a net increase in emissions of 22 tons of CO_2 annually.

3.3. DPL: Elk Neck and Ocean City Projects

Assessment of benefits and costs

Elk Neck

Synapse reviewed the benefits and costs for the Elk Neck BESS and found several issues with the proposal that should be addressed by DPL prior to the Commission approving this proposal.

1. PJM Market revenue should be excluded from BCA

   We do not find it appropriate to include potential PJM Market revenues as a quantified benefit in the BCA. Virtual power plants do not currently qualify for participation in PJM's wholesale power markets. While DPL notes in response to Staff DR 1-60 that the University of Delaware operates a Virtual Power Plant Vehicle-to-Grid project to participate in the PJM regulation market, DPL will still have to submit a pilot project application to PJM. There is no guarantee that PJM will accept the proposal for the pilot. For these reasons, it is premature to count these revenues in the BCA. When the benefits of PJM revenues are removed from the BCA, the project's cost-effectiveness drops to 0.14.

2. Proposal should be enhanced to leverage additional customer benefits

   Given the low BCA of the Elk Neck pilot and the significant uncertainty regarding future potential PJM Market revenues, the Commission should require DPL to enhance its proposal to increase benefits to customers beyond those related solely to the usage of the installed batteries. While Synapse understands that the purpose of the pilot is to test battery storage, any investment paid for by ratepayers should maximize the benefit received to the extent possible. It is not clear that DPL is planning to maximize all the capabilities of Sunverge software platform to enable its customers to realize the full suite of potential benefits.

   On page 39 of its Application, DPL indicates that the Sunverge platform can be used to integrate and manage energy storage, photovoltaics, smart home devices such as thermostats and hot water heaters, and EV chargers. However, it is not clear whether DPL will coordinate any of these additional technologies, that may be offered through its other programs, with the BESS pilot.[25] At a minimum, If this proposal is approved, DPL should coordinate this pilot with its other customer offerings that have the potential to be integrated with the Sunverge platform to take full advantage of that investment and maximize benefits to customers. In addition, DPL should consider targeting the BESS pilot to customers with existing solar PV systems to realize

[25] Case No. 9619 OPC DR 01-27.

additional learnings and benefits of the platform and increase carbon emissions reductions. DPL indicated there are 121 net energy metering customers on feeder MD 3487.[26]

Synapse also recommends that the Commission require DPL to coordinate its other customer offerings (EmPower incentives, direct-load control programs, time-of-use rates) with the Elk Neck pilot and examine whether additional benefits can be obtained from integrating additional customer devices into the platform. This could include targeted outreach and education to customers participating in the BESS pilot regarding other DPL offerings, tariffs, and ways to manage energy usage. As part of the reporting requirements for the Elk Neck pilot, the Commission should require DPL to report on any actions and resulting outcomes of such coordination efforts.

Further, DPL should track and quantify the additional benefits it claims customers will realize over the course of the pilot. Specifically, DPL cites that a benefit of the Elk Neck pilot is that "customers who receive batteries can realize additional benefits beyond access to back-up power including: an opportunity to store electricity from installed photovoltaic arrays for use at a later time, an opportunity to reduce electricity use from the grid during Peak Energy Savings Credit events (Delmarva Power's residential dynamic pricing program), and an opportunity to reduce grid supplied energy use in response to a Delmarva Power or third-party supplier time-of-use rates."[27] When prompted DPL indicated it had not quantified these benefits.[28] It will be important as part of any final evaluation of this pilot to understand if these benefits were realized and what the quantified value was.

Ocean City

Synapse reviewed the benefits and costs for the Ocean City BESS and has found several issues with the proposal that the Commission should take into account in its review. Although the project is not cost-effective, we recommend that the project be approved with the following conditions. The Ocean City project represents a sufficiently distinct project relative to the Elk Neck project providing learnings for a utility owned system deriving most of its value from PJM wholesale market activities.

1. <u>Significant weight should not be given to qualitative benefits</u>

   We understand that BESS projects are new to the utilities and not all qualitative benefits are known at this point. However, it appears in several cases there is no substance behind these claimed benefits. For example, DPL states that operation of the Ocean City BESS during high load periods will reduce the thermal stress on distribution equipment, thereby extending the equipment's service life.[29] However, when more detail was requested, DPL indicated it has not

[26] Case No. 9619 Staff DR 01-76.

[27] Application of Joint Exelon Utilities for Approval of Energy Storage Pilot Projects, Case No. 9619, at pg. 38.

[28] Case No. 9619 OPC DR 01-39.

[29] Application of Joint Exelon Utilities at 48.

estimated how long the service life would be extended.[30] Similarly, DPL claims that there will be a noise avoidance benefit, yet does not have access to annual noise complaints.[31] We recommend that, upon approval, that DPL be directed to quantify some of the most promising qualitative benefits identified in its application.

2. Capital costs are above industry average

   The proposed capital costs for the Ocean City pilot appear high compared to recent industry benchmarking studies. The Bloomberg New Energy Finance survey cited in the Joint Exelon Utilities filing indicates that the average fully-installed cost for a four-hour utility-scale BESS in 2019 was $370/kWh.[32] This is much lower than the capital cost of the 3.6 MWh Ocean City BESS at $1,313/kWh. This brings into question whether the proposed capital costs are reasonable and whether the contingency costs are warranted for this project.

Environmental impact assessment

The Elk Neck and Ocean City BESS proposals are each intended to address up to 12 summer peak events, for a total of 24 events annually. Delmarva notes in its filing that the two BESSs may also participate in energy arbitrage starting in 2024.

The two BESSs will typically charge during off-peak hours before an anticipated reliability event (10pm-7am). Further, the Elk Neck battery has a discharge limitation of 90 percent, while the Ocean City battery has a discharge limitation of 80 percent. Delmarva states no intention of pairing the Ocean City BESS with renewable energy sources; however, the utility does state that the Elk Neck BESS was recommended "to explore the ability of residential batteries to help accommodate the increasing quantity of distributed generation" (Joint Exelon Filing Page 37 of 89). In the filing and discovery response, Delmarva makes no commitment to charging the Elk Neck battery with distributed solar PV, despite there being 121 net-metered customers on the feeder (see MD 9619 Staff DR 1-76). The utility states that solar net-metered customers must elect to have their solar PV arrays connected to the battery (OPC DR 2-18).

The Elk Neck BESS is a 0.5 MW / 1.5 MWh battery with an RTE of 84 percent and the Ocean City BESS is a 1 MW / 3 MWh battery with an RTE of 90 percent. Delmarva was unable to provide an anticipated charge-discharge profile for these two BESS projects. We therefore developed an approximate profile for a typical year of battery operation (8,760 hours) to input into the AVERT tool. The profile was developed using information provided in OPC DR-2-21 Attachment, which contains summer peak event details from the last five years. These events predominantly take place during weekday afternoons

[30] Case No. 9619 OPC DR 01-41.

[31] Case No. 9619 Staff DR 01-95.

[32] The Bloomberg New Energy Finance, Energy Storage System Costs Survey 2019, October 2019. This survey was provided as a confidential attachment to the Exelon Utilities' response to Staff DR 1-44. However, counsel for the Exelon Utilities agreed that the report could be cited publically for the above proposition.

starting around 1 or 2pm, and last for about 4 hours. Our profile assumed that all 12 summer peak events took place at similar times and for similar durations.

Using the specifications of its proposed batteries and the methodology recommended by the PC44 Working Group, Delmarva calculates that the Elk Neck BESS will *displace* 0.5 short tons of CO_2 per year (MD 9619 Staff DR 1-70 Attachment G, Tab "EPH 01") and the Ocean City BESS will *displace* 1.03 short tons of CO_2 per year (MD 9619 Staff DR 1-93 Attachment G, Tab "EPH 01"). As mentioned above, Delmarva's calculation omits any emissions associated with the RTE losses of the battery and neglects to analyze marginal emissions at a monthly or hourly scale.

Our analysis of these two BESS projects using the AVERT tool indicates that the Elk Neck BESS is expected to have negligible energy consumption and emissions impacts, due to its small battery size. However, the Ocean City BESS is expected to have a net *consumption* in energy of 20 MWh annually.[33] Based on the hours when the Ocean City BESS is expected to operate, it will have a net *increase* in emissions of 11 tons of CO_2 annually.

Given the efficiency of the batteries and the expected operation schedule of the Elk Neck and Ocean City BESS projects, the only way to ensure the projects have a net reduction in emissions is to pair the batteries with a renewable energy source, such as solar PV, or for the utility to purchase sufficient Class I RECs to cover the annual consumption of the batteries. Since the Elk Neck residential community already has over 100 installations of net-metered solar, we recommend that Delmarva seek out the participation of its customers so that the battery has a net positive environmental impact. This opportunity to pair the Elk Neck battery with solar is one that will have minimal added upfront investment, given that the solar panels have already been installed and paid for by the utility customers. Finally, if these two BESSs are operated for energy arbitrage, that will very likely lead to an increase in emissions. As mentioned above, the operation of a battery for energy arbitrage optimization does not always align with a reduction in emissions. Therefore, we do not recommend the battery operate for energy arbitrage unless the battery is paired with renewables (or purchases Class I RECs) and selling no-emissions electricity back to the grid.

Conclusions and recommendations

Elk Neck

1. While we have concerns with the cost-effectiveness of the Elk Neck project, it is the only proposal examining the virtual power plant business model and is therefore an important learning tool for the state. However, we find that there may be ways to increase benefits to customers from this proposal. If this proposal is approved, DPL should coordinate this pilot with its other customer offerings that have the potential to be integrated with the Sunverge platform to take full advantage of that investment and maximize benefits to customers. In addition, DPL should consider targeting the BESS

[33] Note that AVERT reports results rounded to the nearest ten for precision reasons.

installations to customers with existing solar PV systems to realize the increased benefits of reduced emissions and additional learnings.

2. DPL should report on a regular basis progress in enrolling the Elk Neck virtual power plant as a pilot project for participation in PJM's wholesale markets.

3. Energy arbitrage could cause emissions increases for the Elk Neck project, depending on when the battery is charging and discharging.[34] Delmarva should have included this in its calculations.

Ocean City

1. The Ocean City proposal has value, but the Commission should be prepared to evaluate overall project cost when DPL seeks cost recovery for this project and require DPL to quantify the most promising qualitative benefits presented in its application.

2. Significant risks exist for the PJM market revenue projections for the Ocean City project.

3. DPL should demonstrate that the Ocean City project meets all technical specifications and performance standards for participation in PJM's wholesale markets.

4. There may be ignored emissions impacts from the usage of the Ocean City battery for energy arbitrage, depending on when the battery is charged/discharged.[35] We were unable to analyze this because we did not have access to the charge/discharge profile.

3.4. Pepco: National Harbor and Montgomery County Projects

Assessment of benefits and costs

Synapse reviewed the benefits and costs associated with National Harbor and Montgomery County projects. We agree that the methodology and assumptions are sound, and that both projects are cost-effective. However, there are concerns that the costs are high compared to industry benchmarks for the National Harbor project. The Lazard analysis cited earlier in these comments finds, for front-of-the-meter battery storage used to defer a transmission or distribution need, nameplate energy costs range from $297 to $579/kWh, whereas the National Harbor BESS has a cost of $1,328/kWh. For nameplate capacity costs, Lazard finds a range of $1,784 to $3,474/kW, whereas the National Harbor BESS has a nameplate capacity cost of $ $3,983/kW.[36] This brings into question whether the contingency costs are warranted for this project.

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[34] Fares, R. and M. Webber. 2017. The impacts of storing solar energy in the home to reduce reliance on the utility. Nature Energy. https://www.nature.com/articles/nenergy20171.

[35] Fares, R. and M. Webber. 2017. The impacts of storing solar energy in the home to reduce reliance on the utility. Nature Energy. https://www.nature.com/articles/nenergy20171.

[36] Lazard's Levelized Cost of Storage Analysis 5.0, November 2019. Available at: https://www.lazard.com/media/451087/lazards-levelized-cost-of-storage-version-50-vf.pdf

Environmental impact analysis

The National Harbor and Montgomery County Bus Depot BESS proposals are each intended to shave up to 12 summer peak events, for a total of 24 events annually. The two BESSs will typically charge during off-peak hours before an anticipated reliability event (10pm-7am). Further, the National Harbor battery has a discharge limitation of 80 percent, while the Bus Depot battery has a discharge limitation of 90 percent. Pepco states no intention of pairing the National Harbor BESS with renewable energy sources. However, the utility does state that the Bus Depot BESS will be "potentially charged by solar photovoltaic arrays at the site or available on-site generation" (Join Exelon Filing page 71 of 89). In DR OPC 2-42, Pepco states that the design model of the Bus Depot BESS assumes 100 percent use of the solar PV to charge the battery. AlphaStruxture, the developer of the BESS and solar array, is pursuing the Federal Investment Tax Credit, which requires that the BESS be charged by solar at least 75 percent of the time. Pepco states that the BESS will be charged by an on-site natural gas generator if solar energy is not available, no more than 25 percent of the time.

The National Harbor BESS is a 1 MW / 3 MWh battery with an RTE of 92-96 percent and the Bus Depot BESS is a 1 MW / 3 MWh battery with an RTE of 90 percent. Pepco was unable to provide an anticipated charge-discharge profile for these two BESS projects. We therefore developed an approximate profile for a typical year of battery operation (8,760 hours) to input into the AVERT tool. The profile was developed using information provided in OPC DR-2-21 Attachment, which contains summer peak event details from the last five years. These events predominantly take place during weekday afternoons starting around 1 or 2pm, and last for about 4 hours. Our profile assumed that all 12 summer peak events took place at similar times and for similar durations.

Using the specifications of its proposed batteries and the methodology recommended by the PC44 Working Group, Pepco calculates that the National Harbor and Bus Depot BESSs will each *displace* 1.03 short tons of CO_2 per year (MD 9619 Staff DR 1-113 Attachment G, Tab "EPH 01" and MD 9619 Staff DR 1-127 Attachment F, Tab "EPH 01"). As mentioned above, their calculation for the National Harbor BESS omits any emissions associated with the RTE losses of the battery and neglects to analyze marginal emissions at a monthly or hourly scale. Notably, Pepco does not incorporate the emissions impact of the Bus Depot BESS being charged at least 75 percent of the time by the solar PV array.

Our analysis of these two BESS projects using the AVERT tool indicates that the National Harbor BESS is expected to have a net consumption in energy of 20 MWh annually, equating to an *increase* of 11 short tons of CO_2 per year.[37] However, the Bus Depot BESS is expected to yield a net *reduction* in emissions of 11 tons of CO_2 annually, assuming the battery is charged at 100 percent of the time by the solar array. If the battery needs to charge when solar energy is not available, the emissions benefit will be slightly decreased because the BESS will be charged by an on-site natural gas generator.

[37] Note that AVERT reports results rounded to the nearest ten for precision reasons.

Given the efficiency of the batteries and the expected operation schedule of the National Harbor BESS project, the only way to ensure that project will have a net reduction in emissions is to pair the battery with a renewable energy source, such as solar PV, or for the utility to purchase sufficient Class I RECs to cover the annual energy consumption of the battery.

Conclusions and recommendations

1. Pepco's proposed projects are both cost-effective. However, given the high cost of the National Harbor project compared to the industry average raises questions about the need for a large project cost contingency.
2. Significant risks exist for the PJM market revenue projections for the National Harbor project.
3. Pepco should demonstrate that the National Harbor project meets all technical specifications and performance standards for participation in PJM's wholesale markets.
4. We recommend that the Montgomery County battery be charged by the natural gas generator only as a last resort (if solar panels are not producing energy and if the signal tells the battery to charge for an anticipated peak event).

Case No. 9619 -- Data Responses Cited in Synapse Report

Exelon Utilities Response to OPC 1-2
Exelon Utilities Response to OPC 1-10
Exelon Utilities Response to OPC 1-13
Exelon Utilities Response to OPC 1-27
Exelon Utilities Response to OPC 1-28
Exelon Utilities Response to OPC 1-35
Exelon Utilities Response to OPC 1-39
Exelon Utilities Response to OPC 1-41
Exelon Utilities Response to OPC 2-2
Exelon Utilities Response to OPC 2-7
Exelon Utilities Response to OPC 2-11
Exelon Utilities Response to OPC 2-18
Exelon Utilities Response to OPC 2-21, Attachment
Exelon Utilities Response to OPC 2-42

Exelon Utilities Response to Staff 1-21, Attachment A, tab eph-01
Exelon Utilities Response to Staff 1-60
Exelon Utilities Response to Staff 1-70, Attachment G, tab eph-01
Exelon Utilities Response to Staff 1-76
Exelon Utilities Response to Staff 1-93, Attachment G, tab eph-01
Exelon Utilities Response to Staff 1-95
Exelon Utilities Response to Staff 1-113, Attachment G, tab eph-01
Exelon Utilities Response to Staff 1-127, Attachment F, tab eph-01

PE Response to OPC 1-14, Attachment A
PE Response to OPC 1-37, Attachment A

PE Response to Staff 2-1, Attachments A and B, Avoided Distribution tab
PE Response to Staff 4-7

June 22, 2020

Case No. 9619
Baltimore Gas and Electric Company, Delmarva Power & Light Company, and Potomac Electric Power Company
Response to OPC Data Request 1
Request Received: 05/20/2020
Response Date: 06/03/2020

Item No.: OPCDR01-02

BGE: If one of the proposed BESS projects was not approved by the Commission, would BGE still be able to defer the distribution upgrade as identified on page 13 of the Application? Please explain, why or why not.

RESPONSE:

Yes, BGE would still be able to defer the distribution upgrade if one project was not approved, assuming that the other project could be upgraded to 3.5 MW / 5.5 MWh guaranteed capacity and approved by the Commission.

Case No. 9619
Baltimore Gas and Electric Company, Delmarva Power & Light Company, and Potomac Electric Power Company
Response to OPC Data Request 1
Request Received: 05/20/2020
Response Date: 06/03/2020

Item No.: OPCDR01-10

BGE: Does BGEs forecast for the 34kV feeder identified on page 13 of the Application include projected future investments in energy efficiency, electrification (i.e., electric vehicle charging, electric heat pumps and water heaters for buildings), storage, and/or solar photovoltaics?

RESPONSE:

BGE's load forecast for this location reflects its historical experience with energy efficiency and the energy intensity of electric end-uses. The BGE forecast used on page 13 does not include projected future investments in energy efficiency, electrification, or storage unless there were specific new customer applications that were known at the time the forecast was developed. Please note that because this is a winter forecast with peak demand in the hours before the sun rises, solar photovoltaics were considered as having no impact on the peak forecast hours.

Case No. 9619
Baltimore Gas and Electric Company, Delmarva Power & Light Company, and Potomac Electric Power Company
Response to OPC Data Request 1
Request Received: 05/20/2020
Response Date: 06/03/2020

Item No.: OPCDR01-13

BGE: What would the Avoidance of Utility Distribution Costs be for each BESS project if the undergrounding investment was deferred for only 15-years? Please provide supporting calculations in native format with formulae intact in excel format.

RESPONSE:

BGE has not performed economic calculations related to the referenced deferral period, for the reasons provided in BGE's response to MD 9619 OPCDR01-11.

Case No. 9619
Baltimore Gas and Electric Company, Delmarva Power & Light Company, and Potomac Electric Power Company
Response to OPC Data Request 1
Request Received: 05/20/2020
Response Date: 06/03/2020

Item No.: OPCDR01-27

Elk Neck Project: Referring to page 39 of the Application, which indicates that the Sunverge platform can be used to integrate and manage energy storage, photovoltaics, smart home devices such as thermostats and hot water heaters, and EV chargers, please answer the following:

a) Does Delmarva plan to promote or incentivize any of these additional technologies in the pilot area? Please explain why or why not.
b) Has Delmarva calculated the incremental costs and benefits of adding these additional technologies to the pilot? If yes, please provide the analysis in original format with formulas intact and all relevant work files. If no, please provide the rationale.
c) How many customers in the Elk Neck Site Location area have solar photovoltaics?
d) How many customers in the Elk Neck Site Location have EV chargers?
e) How many customers in the Elk Neck Site Location area are enrolled in the Energy Wise Rewards Program?
f) Will Delmarva plan to provide smart thermostats to customers enrolling in the Elk Neck BESS project? If no, please explain why. If yes, are these costs included in the overall project cost?

RESPONSE:

a) No, the Maryland Energy Storage Pilot Act pilot is intended to test the use of batteries, not incentivize the use of the additional referenced technologies. Any incentives for these other technologies would be sourced through other Commission-authorized programs or other state incentive programs, such as Empower.

b) No, please refer to the response to part (a) above.

c) Please refer to the response to MD 9619 Staff DR01-76.

d) Delmarva Power does not have this information. Please also refer to the response to MD 9619 Staff DR01-71.

e) There are 439 active participants with 519 active devices (5 BYOD) for an estimated load of 478.75 kW.

f) A smart thermostat is not a necessary component of participating in the energy storage pilot. Delmarva Power's residential direct load control program, Energy Wise Rewards, provides a direct install thermostat option as well as a Bring Your Own Device 'BYOD' thermostat option. No targeted recruitment has been planned for Elk Neck at this time. Any program participants who also participate in the Energy Wise Rewards Program will be identified. The purpose of the proposed Virtual Power Plant Project at Elk Neck is to examine the benefits of a battery storage model of this type in Maryland.

Case No. 9619
Baltimore Gas and Electric Company, Delmarva Power & Light Company, and Potomac Electric Power Company
Response to OPC Data Request 1
Request Received: 05/20/2020
Response Date: 06/03/2020

Item No.: OPCDR01-28

Elk Neck Project: Referring to page 39 of the Application, what is the planned customer attrition? Provide background materials used to determine and project this value.

RESPONSE:

The number of recruited participants is 110. Sunverge has experienced approximately 1% customer attrition rate with energy storage systems installed for similar utility programs dating back to 2014.

Case No. 9619
Baltimore Gas and Electric Company, Delmarva Power & Light Company, and Potomac Electric Power Company
Response to OPC Data Request 1
Request Received: 05/20/2020
Response Date: 06/03/2020

Item No.: OPCDR01-35

Elk Neck Project:
Has the Sunverge and/or CLEAResult found electrical panel upgrade costs a barrier to participation in similar projects? If yes, how are they planning to overcome this barrier in the recruitment of customers?

RESPONSE:

No, Sunverge has found that electrical panel upgrade costs have not been a barrier to participation for qualified sites because any such costs are typically minimal. Under the pilot program, the batteries and their installation (other than any electric panel upgrade) will be at no cost to participants.

Case No. 9619
Baltimore Gas and Electric Company, Delmarva Power & Light Company, and Potomac Electric Power Company
Response to OPC Data Request 1
Request Received: 05/20/2020
Response Date: 06/03/2020

Item No.: OPCDR01-39

Elk Neck Project: Referring to page 38 of the Application, referring Delmarva's Peak Energy Savings Credit events, please answer the following:

a) Will customer enrollment in Peak Energy Savings Credit events be required in order to receive a battery through the Elk Neck BESS program?
b) Has Delmarva calculated the reduction in electricity use savings for pilot participants participating in Peak Energy Savings Credit events? If yes, please provide the planned savings for each year of the Elk Neck BESS program, and provide the underlying analysis in original format with formulas intact and all relevant work files. If no, please explain why not.
c) Are the electricity use savings including in the benefits in Table 19? If no, why not?

RESPONSE:

a) No. All Delmarva Power Maryland residential distribution customers are automatically enrolled in the Peak Energy Savings Credit (PESC) Program. No customer enrollment action is required.

b) No. Delmarva Power has not made this calculation because the participating residential customers have not been identified. Achieved reductions will vary by event, be based on individual Customer Baseline Loads, and be based on actual energy consumption at each participant's home. Additionally, use of the batteries for peak shaving, emergency grid events, or possible participation in the PJM ancillary market may mean that energy from the batteries is limited for a specific PESC event.

c) No. Batteries consume more energy than they export.

Case No. 9619
Baltimore Gas and Electric Company, Delmarva Power & Light Company, and Potomac Electric Power Company
Response to OPC Data Request 1
Request Received: 05/20/2020
Response Date: 06/03/2020

Item No.: OPCDR01-41

Ocean City Project: Referring to page 48 of the Application, has Delmarva estimated how long the equipment service life will be extended due to the operation of the BESS during high load periods? If yes, please provide the estimated increase in life, and the source of that estimate.

RESPONSE:

Delmarva Power has not performed this estimation.

Case No. 9619
Baltimore Gas and Electric Company, Delmarva Power & Light Company, and Potomac Electric Power Company
Response to OPC Data Request 2
Request Received: 05/21/2020
Response Date: 06/05/2020

Item No.: OPCDR02-02

Fairhaven Project: At approximately what times of day would the Fairhaven BESS charge? Please provide information on the parameters that determine the charge schedules (plus supporting documentation).

RESPONSE:

It is expected that outside of the approximately 10 grid reliability events per year, the project will be participating in PJM frequency regulation. The project would therefore be charging and discharging based on the PJM signal, and it would not be a regular charging schedule. Charging behavior before a grid reliability event will be contingent on what time of day notice is given and when the capacity is needed, though it is expected that a typical charge would take place during nighttime hours.

Case No. 9619
Baltimore Gas and Electric Company, Delmarva Power & Light Company, and Potomac Electric Power Company
Response to OPC Data Request 2
Request Received: 05/21/2020
Response Date: 06/05/2020

Item No.: OPCDR02-07

Chesapeake Beach Project: At approximately what times of day would the Chesapeake Beach BESS charge? Please provide information on the parameters that determine the charge schedules (plus supporting documentation).

RESPONSE:

For the 10 grid reliability events called by BGE, charging behavior before a grid reliability event will be contingent on what time of day notice is given and when the capacity is needed, though it is expected that a typical charge would take place during nighttime, off-peak hours, when the cost of energy and demand on the system is lower. It is expected that outside of supporting a particular Event Day, the project will charge and discharge at the direction of PJM, based on the PJM regulation signal, and it would not follow a regular charging schedule. The PJM regulation signal is expected to be energy neutral overtime and thus the battery does not need to do any additional charging beyond following the PJM signal.

Case No. 9619
Baltimore Gas and Electric Company, Delmarva Power & Light Company, and Potomac Electric Power Company
Response to OPC Data Request 2
Request Received: 05/21/2020
Response Date: 06/05/2020

Item No.: OPCDR02-11

BGE: Refer to pages 15 and 26, please confirm that the Fairhaven and Chesapeake Beach projects will each respond to 10 winter peak events per year.

a) Please provide details on the 10 winter peak events each year from the last five years, including month, day (weekday/weekend), starting hour, and event duration. Please provide this data in machine-readable spreadsheet format.

RESPONSE:

BGE expects to be able to call on the Chesapeake Beach project for up to 10 times during the Event Period (December 1 – March 31). The Fairhaven project, being owned and operated by BGE, could be called on more than 10 times per year, however, BGE does not expect to do so.

See MD 9619 OPCDR 2-11 Attachment CONFIDENTIAL for details on the one and only winter peak event that occurred in the last five years. In the absence of a BESS, BGE had to shed customer load in response to the experienced overload.

Case No. 9619
Baltimore Gas and Electric Company, Delmarva Power & Light Company, and Potomac Electric Power Company
Response to OPC Data Request 2
Request Received: 05/21/2020
Response Date: 06/05/2020

Item No.: OPCDR02-18

Elk Neck Project: Delmarva states that this project is intended in part to "explore the ability of residential batteries to help accommodate the increasing quantity of distributed generation" (page 37 of 89). Will the Elk Neck residential storage systems charge (either partially or completely) from the distributed solar generation at Elk Neck?

a) If so, what is the expected charging profile of the residential storage systems? Please provide hourly data in machine-readable spreadsheet format in units of MW for any day(s) of the year during which the batteries are expected to charge. Further, please note in each hour if the battery will be charged from the grid or from distributed generation.
b) If not, please explain why Delmarva is not exploring paired storage and solar at this time.

RESPONSE:

Yes, if residential customers with solar PV arrays elect to participate in the battery storage project and have their solar PV arrays directly connected to the battery.

a. If a customer elects to connect their solar PV directly to the battery, the charging profile will vary based upon several factors: 1) the size of the solar array; 2) the availability of sunlight on the array; 3) the electric load at the home at any point in time; 4) the state of charge of the installed batteries; and 5) whether the batteries are being discharged in response to outages, peak shaving events, or emergency grid events. An expected charging profile for these customers cannot be provided in the absence of site-specific information.

b. Not applicable.

Case No. 9619
Baltimore Gas and Electric Company, Delmarva Power & Light Company, and Potomac Electric Power Company
Response to OPC Data Request 2
Request Received: 05/21/2020
Response Date: 06/05/2020

Item No.: OPCDR02-21

Elk Neck Project: Please provide details on 10 peak events and any emergency events for this location per year from the last five years, including month, day (weekday/weekend), starting hour, and duration. Please provide this data in machine-readable spreadsheet format.

RESPONSE:

The attached file provides the dates and times that Delmarva Power's demand response programs were activated over the period of 2015 through 2019. Please see MD 9619 OPC DR 2-21 Attachment. Please refer to https://www.pjm.com/markets-and-operations/demand-response.aspx for a list of PJM emergency demand response reduction requests by utility Zone.

PHI - 19 : PESC Event Details Report

Time run: 6/1/2020 10:21:07 AM

Date of Event	Jurisdiction	Customer Grouping	Start Time	End Time	Duration (Hrs)
07/21/2015					
	Pepco-Maryland	Total Event	02.00 PM	06.00 PM	4
07/30/2015	Delmarva-Delaware	Total Event	02.00 PM	06.00 PM	4
	Delmarva-Maryland	Total Event	02.00 PM	06.00 PM	4
	Pepco-Maryland	Total Event	02.00 PM	06.00 PM	4
08/03/2015	Delmarva-Delaware	Total Event	02.00 PM	06.00 PM	4
	Delmarva-Maryland	Total Event	02.00 PM	06.00 PM	4
	Pepco-Maryland	Total Event	02.00 PM	06.00 PM	4
09/09/2015	Delmarva-Delaware	Total Event	02.00 PM	06.00 PM	4
	Delmarva-Maryland	Total Event	02.00 PM	06.00 PM	4
	Pepco-Maryland	Total Event	02.00 PM	06.00 PM	4
09/25/2015	Delmarva-Delaware	Total Event	02.00 PM	03.00 PM	1
	Delmarva-Maryland	Total Event	02.00 PM	03.00 PM	1
	Pepco-Maryland	Total Event	02.00 PM	03.00 PM	1
07/08/2016	Delmarva-Delaware	Total Event	01.07 PM	05.07 PM	4
	Delmarva-Maryland	Total Event	01.07 PM	05.07 PM	4
	Pepco-Maryland	Total Event	01.07 PM	05.07 PM	4
07/14/2016	Delmarva-Delaware	Total Event	02.00 PM	06.00 PM	4
	Delmarva-Maryland	Total Event	02.00 PM	06.00 PM	4
	Pepco-Maryland	Total Event	02.00 PM	06.00 PM	4
09/08/2016	Delmarva-Maryland	Total Event	02.00 PM	06.00 PM	4
	Pepco-Maryland	Total Event	02.00 PM	06.00 PM	4
10/20/2016	Delmarva-Delaware	Total Event	01.00 PM	02.00 PM	1
	Delmarva-Maryland	Total Event	01.00 PM	02.00 PM	1
	Pepco-Maryland	Total Event	01.00 PM	02.00 PM	1
07/13/2017	Delmarva-Delaware	Total Event	02.00 PM	06.00 PM	4
	Delmarva-Maryland	Total Event	02.00 PM	06.00 PM	4
	Pepco-Maryland	Total Event	02.00 PM	06.00 PM	4
07/21/2017	Delmarva-Maryland	Total Event	01.00 PM	05.00 PM	4
	Pepco-Maryland	Total Event	01.00 PM	05.00 PM	4
10/18/2017	Delmarva-Delaware	Total Event	02.00 PM	03.00 PM	1
	Delmarva-Maryland	Total Event	02.00 PM	03.00 PM	1
	Pepco-Maryland	Total Event	02.00 PM	03.00 PM	1
08/07/2018	Delmarva-Delaware	Total Event	01.00 PM	05.00 PM	4
	Delmarva-Maryland	Total Event	01.00 PM	05.00 PM	4
	Pepco-Maryland	Total Event	01.00 PM	05.00 PM	4
08/29/2018	Delmarva-Delaware	Total Event	01.00 PM	05.00 PM	4
	Delmarva-Maryland	Total Event	01.00 PM	05.00 PM	4
	Pepco-Maryland	Total Event	01.00 PM	05.00 PM	4
09/19/2018	Delmarva-Delaware	Total Event	01.00 PM	02.00 PM	1
	Delmarva-Maryland	Total Event	01.00 PM	02.00 PM	1
	Pepco-Maryland	Total Event	01.00 PM	02.00 PM	1
07/19/2019	Delmarva-Delaware	Total Event	01.00 PM	05.00 PM	4
	Delmarva-Maryland	Total Event	01.00 PM	05.00 PM	4
	Pepco-Maryland	Total Event	01.00 PM	05.00 PM	4
09/13/2019	Delmarva-Delaware	Total Event	01.00 PM	02.00 PM	1
	Delmarva-Maryland	Total Event	01.00 PM	02.00 PM	1
	Pepco-Maryland	Total Event	01.00 PM	02.00 PM	1

Case No. 9619
Baltimore Gas and Electric Company, Delmarva Power & Light Company, and Potomac Electric Power Company
Response to OPC Data Request 2
Request Received: 05/21/2020
Response Date: 06/05/2020

Item No.: OPCDR02-42

Bus Depot Project: On page 71 of 89, Pepco states that the BESS will "be potentially charged by solar photovoltaic arrays at the site or available on-site generation."

a) What factors will determine whether or not the BESS will be charged by solar photovoltaic arrays at the site or available on-site generation? What is the expected probability of onsite charging by photovoltaic arrays and what is the expected probability of onsite charging by other onsite generation?
b) What is the energy source and associated air emissions factors of the on-site generation?
c) Was on-site charging (from solar or other on-site source) included in the calculations of air emissions reduction? If so, please provide supporting documentation.

RESPONSE:

a) The BESS will be charged by the solar PV arrays whenever possible. If solar energy is not available due to cloud conditions or because it is being used to eliminate day-time load, the BESS can be charged by on-site generation. AlphaStruxure's current design model assumes 100% use of the solar PV to charge the BESS. Note that the Investment Tax Credit available to AlphaStruxure permits up to 25 percent of BESS charging to be sourced from on-site gas generation.

b) Natural gas. AlphaStruxure has provided the following air emissions details for the generator they have selected.

Engine Type and fuel: Non-Emergency SI Lean Burn Natural Gas and LPG
Max Engine Power: 500<HP<1,350

Emission Standards					
g/HP-hr			*Ppmvd at 15% O_2*		
NO_x	*CO*	*VOC^d*	*NO_x*	*CO*	*VOC^d*
1.0	*2.0*	*.7*	*82*	*270*	*60*

c) No. Pepco does not have the necessary information for this calculation. It is important to note that the expected impact would be an additional reduction of air emissions as a result of the installed BESS.

Case No. 9619
Baltimore Gas and Electric Company, Delmarva Power & Light Company, and Potomac Electric Power Company
Response to Staff Data Request 1
Request Received: 05/06/20
Response Date: 05/20/20

Item No.: Staff DR01-21

Fairhaven Substation Project: Please provide the work papers and excel files with all relevant inputs, formulas, and equations used to create Table 6, Table 7, Table 9, and Table 10. For all hardcoded values please include descriptors that identify the origin of the assumption or input. If the value is the result of another analysis not included with the work papers or excel sheets please describe the analysis and how the value was arrived at.

RESPONSE:

Please find the requested information attached as the following files:

1) MD 9619 Staff DR 1-21 Attachment A
2) MD 9619 Staff DR 1-21 Attachment B
3) MD 9619 Staff DR 1-21 Attachment C
4) MD 9619 Staff DR 1-21 Attachment D
5) MD 9619 Staff DR 1-21 Attachment E

EPH 01: Air Emissions Reduction

Applicable Global Assumptions

		Fairhaven	Chesapeake Beach
1	MWhs shifted Peak to Off Peak Per Year	40.0 MWhs	15.0 MWhs
2	Net reduction in GHG emissions	84.0 pounds/MWH	84.0 pounds/MWH
3	Monetized value of Greenhouse Gas Emission	$ 40.00 per short ton	$ 40.00 per short ton
4	Inflation rate - annual	2.0%	2.0%

Intermediate Calculation

(Year 1 benefits)

	Fairhaven	Chesapeake Beach
Net reductions in GHG emission in pounds	3,360	1,260
Net reductions in GHG emission in short tons	1.68	1
Monetized value of GHG emission	$ 67	$ 25

Expected Benefits: Fairhaven

	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31
	2022	2023	2024	2025	2026	2027	2028	2029	2030	2031	2032	2033	2034	2035	2036	2037	2038	2039	2040	2041	2042	2043	2044	2045	2046	2047	2048	2049	2050	2051	2051
Prior Year Nominal Benefit	$67	$67	$69	$70	$71	$73	$74	$76	$77	$79	$80	$82	$84	$84	$84	$84	$84	$84	$84	$84	$84	$84	$84	$84	$84	$84	$84	$84	$84	$84	$84
Add Inflation Rate		$1	$1	$1	$1	$1	$1	$2	$2	$2	$2	$2	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0
Expected Benefits (nominal $)	$67	$69	$70	$71	$73	$74	$76	$77	$79	$80	$82	$84	$84	$84	$84	$84	$84	$84	$84	$84	$84	$84	$84	$84	$84	$84	$84	$84	$84	$84	$84

Note: Totals may not tie due to rounding.

Held at year 2033 level

Expected Benefits: Chesapeake Beach

	2022	2023	2024	2025	2026	2027	2028	2029	2030	2031	2032	2033	2034	2035	2036	2037	2038	2039	2040	2041	2042	2043	2044	2045	2046	2047	2048	2049	2050	2051	2052
Prior Year Nominal Benefit	$25	$25	$26	$26	$27	$27	$28	$28	$29	$30	$30	$31	$31	$31	$31	$31	$31	$31	$31	$31	$31	$31	$31	$31	$31	$31	$31	$31	$31	$31	$31
Add Inflation Rate		$1	$1	$1	$1	$1	$1	$1	$1	$1	$1	$1	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0
Expected Benefits (nominal $)	$25	$26	$26	$27	$27	$28	$28	$29	$30	$30	$31	$31	$31	$31	$31	$31	$31	$31	$31	$31	$31	$31	$31	$31	$31	$31	$31	$31	$31	$31	$31

Note: Totals may not tie due to rounding.

Held at year 2033 level

Case No. 9619
Baltimore Gas and Electric Company, Delmarva Power & Light Company, and Potomac Electric Power Company
Response to Staff Data Request 1
Request Received: 05/06/20
Response Date: 05/20/20

Item No.: Staff DR01-60

Elk Neck Project: Does PJM currently support virtual power plants?

RESPONSE:

At this time the University of Delaware operates a Virtual Power Plant Vehicle-to-Grid project to participate in the PJM regulation market. Delmarva Power is planning to submit a pilot project application to PJM to explore the interaction of this aggregated residential behind-the-meter battery virtual power plant in the PJM wholesale market.

Case No. 9619
Baltimore Gas and Electric Company, Delmarva Power & Light Company, and Potomac Electric Power Company
Response to Staff Data Request 1
Request Received: 05/06/20
Response Date: 05/20/20

Item No.: Staff DR01-70

Elk Neck Project: Please provide the work papers and excel files with all relevant inputs, formulas, and equations used to create Table 17, Table 18, and Table 19. For all hardcoded values please include descriptors that identify the origin of the assumption or input. If the value is the result of another analysis not included with the work papers or excel sheets please describe the analysis and how the value was arrived at.

RESPONSE:

The table below provides a summary of the attached files.

File Name	Type	Primary Function
MD 9619 Staff DR 1-70 Attachment A	Word	Schematic overview of files pertaining to this DR
MD 9619 Staff DR 1-70 Attachment B	Excel	EmPower MD - Avoided Cost Data
MD 9619 Staff DR 1-70 Attachment C Confidential	Excel	Wholesale Market Revenue Projections
MD 9619 Staff DR 1-70 Attachment D	Excel	Carrying Charge and Discount Rate
MD 9619 Staff DR 1-70 Attachment E	Excel	Average kWh usage by customer type
MD 9619 Staff DR 1-70 Attachment F	Excel	Cost Data
MD 9619 Staff DR 1-70 Attachment G	Excel	Integrated Benefit Cost Model

EPH 01: Air Emissions Reduction

Applicable Global Assumptions

1	Energy Storage Power Rating	0.5	MW
2	Energy Storage Energy Capacity	3.0	HR
3	Energy Storage - Round Trip efficiency	85.0%	
4	Energy Storage - No of discharges in year	12.0	
5	Peak hour duration	80%	of energy capacity
6	Net reduction in GHG emissions	84.0	pounds/MWH
7	Monetized value of Greenhouse Gas Emission	40.0	per short ton
10	Inflation rate - annual	2.0%	

Intermediate Calculation

(Year 1 benefits)

Net reductions in GHG emission in pounds 1,028

Net reductions in GHG emission in short tons 0.51 → GHG reduction in pounds/2,000)

Monetized value of GHG emission $ 20.6 → Net GHG reduction(short tons)*Monetized Value of GHG emission ($40)

Expected Benefits

	2022	2023	2024	2025	2026	2027	2028	2029	2030	2031	2032	2033	2034	2035	2036
Prior Year Nominal Benefit	$21	$21	$21	$21	$22	$22	$23	$23	$24	$24	$25	$25	$26	$26	$27
Add Inflation Rate [1]		$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$1	$1	$1	$1
Expected Benefits (nominal $)	$21	$21	$21	$22	$22	$23	$23	$24	$24	$25	$25	$26	$26	$27	$27

Note: Totals may not tie due to rounding.

[1] Calculation: Prior YearNominal Benefit * expected inflation

[3] Calculation: Expected benefits (real $) * inflation rate.

Case No. 9619
Baltimore Gas and Electric Company, Delmarva Power & Light Company, and Potomac Electric Power Company
Response to Staff Data Request 1
Request Received: 05/06/20
Response Date: 05/20/20

Item No.: Staff DR01-76

Elk Neck Project: How many net energy metering customers are currently located at feeders impacted by the Elk Neck project?

RESPONSE:

There are 121 net energy metering customers on feeder MD 3487.

Case No. 9619
Baltimore Gas and Electric Company, Delmarva Power & Light Company, and Potomac Electric Power Company
Response to Staff Data Request 1
Request Received: 05/06/20
Response Date: 05/20/20

Item No.: Staff DR01-93

Ocean City Project: Please provide the work papers and excel files with all relevant inputs, formulas, and equations used to create Table 22, Table 23, and Table 24. For all hardcoded values please include descriptors that identify the origin of the assumption or input. If the value is the result of another analysis not included with the work papers or excel sheets please describe the analysis and how the value was arrived at.

RESPONSE:

The table below provides a summary of the attached files

File Name	Type	Primary Function
MD 9619 Staff DR 1-93 Attachment A	Word	Schematic overview of files pertaining to this DR
MD 9619 Staff DR 1-93 Attachment B	Excel	EmPower MD - Avoided Cost Data
MD 9619 Staff DR 1-93 Attachment C Confidential	Excel	Wholesale Market Revenue Projections
MD 9619 Staff DR 1-93 Attachment D	Excel	Carrying Charge and Discount Rate
MD 9619 Staff DR 1-93 Attachment E	Excel	Average kWh usage by customer type
MD 9619 Staff DR 1-93 Attachment F	Excel	Cost Data
MD 9619 Staff DR 1-93 Attachment G	Excel	Integrated Benefit Cost Model

EPH 01: Air Emissions Reduction

Applicable Global Assumptions

1	Energy Storage Power Rating	1.0	MW
2	Energy Storage Energy Capacity	3.0	HR
3	Energy Storage - Round Trip efficiency	85.0%	
4	Energy Storage - No of discharges in year	12.0	
5	Peak hour duration	80%	of energy capacity
6	Net reduction in GHG emissions	84.0	pounds/MWH
7	Monetized value of Greenhouse Gas Emission	40.0	per short ton
10	Inflation rate - annual	2.0%	

Intermediate Calculation

(Year 1 benefits)

Net reductions in GHG emission in pounds 2,056 → { Energy Storage Power Rating * Energy Storage Energy Capacity*Round Trip Efficiency *No of discharges in year}

Net reductions in GHG emission in short tons 1.03 → GHG reduction in pounds/2,000)

Monetized value of GHG emission $ 41.1 → Net GHG reduction(short tons)*Monetized Value of GHG emission ($40)

Expected Benefits

	2022	2023	2024	2025	2026	2027	2028	2029	2030	2031	2032	2033	2034	2035	2036
Prior Year Nominal Benefit	$41	$41	$42	$43	$44	$45	$45	$46	$47	$48	$49	$50	$51	$52	$53
Add Inflation Rate [1]		$1	$1	$1	$1	$1	$1	$1	$1	$1	$1	$1	$1	$1	$1
Expected Benefits (nominal $)	$41	$42	$43	$44	$45	$45	$46	$47	$48	$49	$50	$51	$52	$53	$54

Note: Totals may not tie due to rounding.

Held at year 2033 level

[1] Calculation: Prior YearNominal Benefit * expected inflation

[3] Calculation: Expected benefits (real $) * inflation rate.

Case No. 9619
Baltimore Gas and Electric Company, Delmarva Power & Light Company, and Potomac Electric Power Company
Response to Staff Data Request 1
Request Received: 05/06/20
Response Date: 05/20/20

Item No.: Staff DR01-95

Ocean City Project: What is the average annual noise complaint received by DPL for the backup fossil fueled generators at feeders impacted by the Ocean City project in the last 5 years?

RESPONSE:

Delmarva Power does not have access to this information.

Case No. 9619
Baltimore Gas and Electric Company, Delmarva Power & Light Company, and Potomac Electric Power Company
Response to Staff Data Request 1
Request Received: 05/06/20
Response Date: 05/20/20

Item No.: Staff DR01-113

National Harbor Project: Please provide the work papers and excel files with all relevant inputs, formulas, and equations used to create Table 28, Table 29, and Table 30. For all hardcoded values please include descriptors that identify the origin of the assumption or input. If the value is the result of another analysis not included with the work papers or excel sheets please describe the analysis and how the value was arrived at.

RESPONSE:

The table below provides a summary of the attached files.

File Name	Type	Primary Function
MD 9619 Staff DR 1-113 Attachment A	Word	Schematic overview of files pertaining to this DR
MD 9619 Staff DR 1-113 Attachment B	Excel	EmPower MD - Avoided Cost Data
MD 9619 Staff DR 1-113 Attachment C Confidential	Excel	Wholesale Market Revenue Projections
MD 9619 Staff DR 1-113 Attachment D	Excel	Carrying Charge and Discount Rate
MD 9619 Staff DR 1-113 Attachment E	Excel	Average kWh usage by customer type
MD 9619 Staff DR 1-113 Attachment F	Excel	Cost Data
MD 9619 Staff DR 1-113 Attachment G	Excel	Integrated Benefit Cost Model

EPH 01: Air Emissions Reduction

Applicable Global Assumptions

1	Energy Storage Power Rating	1.0	MW
2	Energy Storage Energy Capacity	3.0	HR
3	Energy Storage - Round Trip efficiency	85.0%	
4	Energy Storage - No of discharges in year	12.0	
5	Peak hour duration	80%	of energy capacity
6	Net reduction in GHG emissions	84.0	pounds/MWH
7	Monetized value of Greenhouse Gas Emission	40.0	per short ton
10	Inflation rate - annual	2.0%	

Intermediate Calculation

(Year 1 benefits)

Net reductions in GHG emission in pounds 2,056 → {Energy Storage Power Rating * Energy Storage Energy Capacity*Round Trip Efficiency *No of discharges in year}

Net reductions in GHG emission in short tons 1.03 → GHG reduction in pounds/2,000)

Monetized value of GHG emission $ 41.1 → Net GHG reduction(short tons)*Monetized Value of GHG emission ($40)

Expected Benefits

	2022	2023	2024	2025	2026	2027	2028	2029	2030	2031	2032	2033	2034	2035	2036
Prior Year Nominal Benefit	$41	$41	$42	$43	$44	$45	$45	$46	$47	$48	$49	$50	$51	$52	$53
Add Inflation Rate [1]		$1	$1	$1	$1	$1	$1	$1	$1	$1	$1	$1	$1	$1	$1
Expected Benefits (nominal $)	$41	$42	$43	$44	$45	$45	$46	$47	$48	$49	$50	$51	$52	$53	$54

Note: Totals may not tie due to rounding.

Held at year 2033 level

[1] Calculation: Prior YearNominal Benefit * expected inflation

[3] Calculation: Expected benefits (real $) * inflation rate.

Case No. 9619
Baltimore Gas and Electric Company, Delmarva Power & Light Company, and Potomac Electric Power Company
Response to Staff Data Request 1
Request Received: 05/06/20
Response Date: 05/20/20

Item No.: Staff DR01-127

Montgomery County Bus Depot Project: Please provide the work papers and excel files with all relevant inputs, formulas, and equations used to create Table 34, Table 35, and Table 36. For all hardcoded values please include descriptors that identify the origin of the assumption or input. If the value is the result of another analysis not included with the work papers or excel sheets please describe the analysis and how the value was arrived at.

RESPONSE:

File Name	Type	Primary Function
MD 9619 Staff DR 1-127 Attachment A	Word	Schematic overview of files pertaining to this DR
MD 9619 Staff DR 1-127 Attachment B	Excel	EmPower MD - Avoided Cost Data
MD 9619 Staff DR 1-127 Attachment C	Excel	Levelized Carrying Charge and Discount Rate
MD 9619 Staff DR 1-127 Attachment D	Excel	Average kWh usage by customer type
MD 9619 Staff DR 1-127 Attachment E	Excel	Cost Data
MD 9619 Staff DR 1-127 Attachment F	Excel	Integrated Benefit Cost Model

EPH 01: Air Emissions Reduction

Applicable Global Assumptions

1	Energy Storage Power Rating	1.0	MW
2	Energy Storage Energy Capacity	3.0	HR
3	Energy Storage - Round Trip efficiency	85.0%	
4	Energy Storage - No of discharges in year	12.0	
5	Peak hour duration	80%	of energy capacity
6	Net reduction in GHG emissions	84.0	pounds/MWH
7	Monetized value of Greenhouse Gas Emission	40.0	per short ton
10	Inflation rate - annual	2.0%	

Intermediate Calculation

(Year 1 benefits)

Net reductions in GHG emission in pounds 2,056 → { Energy Storage Power Rating * Energy Storage Energy Capacity*Round Trip Efficiency *No of discharges in year}

Net reductions in GHG emission in short tons 1.03 → GHG reduction in pounds/2,000)

Monetized value of GHG emission $ 41.1 → Net GHG reduction(short tons)*Monetized Value of GHG emission ($40)

Expected Benefits

	2022	2023	2024	2025	2026	2027	2028	2029	2030	2031	2032	2033	2034	2035	2036
Prior Year Nominal Benefit	$41	$41	$42	$43	$44	$45	$45	$46	$47	$48	$49	$50	$51	$52	$53
Add Inflation Rate [1]		$1	$1	$1	$1	$1	$1	$1	$1	$1	$1	$1	$1	$1	$1
Expected Benefits (nominal $)	$41	$42	$43	$44	$45	$45	$46	$47	$48	$49	$50	$51	$52	$53	$54

Note: Totals may not tie due to rounding.

Held at year 2033 level

[1] Calculation: Prior YearNominal Benefit * expected inflation

[3] Calculation: Expected benefits (real $) * inflation rate.

THE POTOMAC EDISON COMPANY
DATA REQUEST OF OFFICE OF PEOPLE'S COUNSEL
ELECTRIC STORAGE PILOT

Discovery request submitted by: Office of People's Counsel

Discovery request set number: First

Response date: June 4, 2020

OPC-1.14

Please provide details on any weather- or tree-related outage events within the last five years at the Town Hill feeder, including month, day (weekday/weekend), starting hour, and duration. Please provide this data in machine-readable spreadsheet format.

Response:

Please see the Company's response to OPC-1.14, Attachment A.

Start Date	Substation	Circuit	Cause	Max Duration (min)	OPC # 1.14, Attachment A		
2/10/2016 11:12	HANCOCK	TOWN HILL	TREES OFF ROW-TREE	228			
3/25/2016 14:34	HANCOCK	TOWN HILL	TREES OFF ROW-TREE	578			
5/21/2016 8:14	HANCOCK	TOWN HILL	TREES OFF ROW-TREE	331			
6/6/2016 15:59	HANCOCK	TOWN HILL	TREES ON ROW	165			
6/8/2016 11:44	HANCOCK	TOWN HILL	TREES OFF ROW-TREE	237			
6/12/2016 19:02	HANCOCK	TOWN HILL	TREES OFF ROW-TREE	160			
6/14/2016 14:45	HANCOCK	TOWN HILL	TREES OFF ROW-TREE	420			
6/16/2016 15:58	HANCOCK	TOWN HILL	TREES OFF ROW-TREE	296			
6/16/2016 16:07	HANCOCK	TOWN HILL	TREES OFF ROW-TREE	1467			
6/16/2016 16:06	HANCOCK	TOWN HILL	TREES OFF ROW-TREE	1412			
6/16/2016 16:05	HANCOCK	TOWN HILL	TREES OFF ROW-TREE	441			
6/16/2016 16:03	HANCOCK	TOWN HILL	TREES OFF ROW-TREE	323			
6/16/2016 20:52	HANCOCK	TOWN HILL	Trees Off ROW-Tree	34			
6/16/2016 21:54	HANCOCK	TOWN HILL	TREES OFF ROW-TREE	736			
6/17/2016 9:23	HANCOCK	TOWN HILL	TREES ON ROW	484			
6/17/2016 13:01	HANCOCK	TOWN HILL	TREES ON ROW	315			
7/3/2016 10:50	HANCOCK	TOWN HILL	TREES OFF ROW-TREE	405			
7/17/2016 14:40	HANCOCK	TOWN HILL	TREES OFF ROW-LIMB	122			
7/17/2016 16:01	HANCOCK	TOWN HILL	Trees Off ROW-Limb	41			
8/16/2016 13:35	HANCOCK	TOWN HILL	TREES OFF ROW-TREE	155			
8/18/2016 0:26	HANCOCK	TOWN HILL	TREES OFF ROW-LIMB	459			
9/5/2016 3:27	HANCOCK	TOWN HILL	TREES OFF ROW-TREE	308			
9/5/2016 10:35	HANCOCK	TOWN HILL	TREES OFF ROW-TREE	195			
9/7/2016 16:02	HANCOCK	TOWN HILL	TREES OFF ROW-TREE	215			
9/7/2016 16:30	HANCOCK	TOWN HILL	FORCED OUTAGE,Trees Off ROW-Tree	183			
9/9/2016 22:54	HANCOCK	TOWN HILL	TREES OFF ROW-TREE	456			
9/25/2016 3:30	HANCOCK	TOWN HILL	TREES OFF ROW-TREE	485			
10/7/2016 15:21	HANCOCK	TOWN HILL	TREES OFF ROW-TREE	84			
10/7/2016 16:36	HANCOCK	TOWN HILL	TREES OFF ROW-TREE	19			
10/22/2016 18:48	HANCOCK	TOWN HILL	TREES OFF ROW-TREE	133			
11/21/2016 4:20	HANCOCK	TOWN HILL	TREES OFF ROW-TREE	352			
1/23/2017 10:53	HANCOCK	TOWN HILL	TREES OFF ROW-TREE	415			
2/12/2017 21:47	HANCOCK	TOWN HILL	TREES OFF ROW-TREE	1054			
3/2/2017 4:46	HANCOCK	TOWN HILL	TREES OFF ROW-TREE	264			
3/2/2017 5:24	HANCOCK	TOWN HILL	TREES OFF ROW-TREE	123			
5/2/2017 19:37	HANCOCK	TOWN HILL	TREES OFF ROW-TREE	116			
5/30/2017 18:00	HANCOCK	TOWN HILL	TREES OFF ROW-TREE	470			
7/23/2017 17:26	HANCOCK	TOWN HILL	TREES OFF ROW-TREE	119			
7/29/2017 0:45	HANCOCK	TOWN HILL	TREES OFF ROW-TREE	449			
8/12/2017 15:57	HANCOCK	TOWN HILL	LIGHTNING	457			
9/5/2017 14:58	HANCOCK	TOWN HILL	TREES OFF ROW-TREE	282			
9/26/2017 17:38	HANCOCK	TOWN HILL	TREES OFF ROW-TREE	276			
10/30/2017 4:53	HANCOCK	TOWN HILL	TREES OFF ROW-TREE	767			
10/30/2017 4:01	HANCOCK	TOWN HILL	TREES OFF ROW-TREE	524			
11/4/2017 13:46	HANCOCK	TOWN HILL	TREES ON ROW	144			
1/4/2018 15:34	HANCOCK	TOWN HILL	TREES OFF ROW-TREE	281			
3/2/2018 0:22	HANCOCK	TOWN HILL	TREES OFF ROW-TREE	574			
3/2/2018 2:47	HANCOCK	TOWN HILL	TREES OFF ROW-TREE	673			
3/2/2018 14:06	HANCOCK	TOWN HILL	TREES OFF ROW-TREE	1664			
3/2/2018 13:33	HANCOCK	TOWN HILL	TREES OFF ROW-TREE	1552			
3/2/2018 16:35	HANCOCK	TOWN HILL	TREES OFF ROW-TREE	1271			
3/5/2018 8:59	HANCOCK	TOWN HILL	TREES OFF ROW-TREE	1539			
3/5/2018 14:06	HANCOCK	TOWN HILL	TREES - SEC/SERVICE	189			
5/3/2018 11:59	HANCOCK	TOWN HILL	TREES OFF ROW-TREE	341			
5/16/2018 4:52	HANCOCK	TOWN HILL	TREES OFF ROW-TREE	698			
6/2/2018 23:47	HANCOCK	TOWN HILL	TREES OFF ROW-TREE	171			
6/3/2018 8:28	HANCOCK	TOWN HILL	TREES OFF ROW-TREE	1077			
6/7/2018 12:30	HANCOCK	TOWN HILL	TREES OFF ROW-LIMB	115			
6/10/2018 23:00	HANCOCK	TOWN HILL	TREES OFF ROW-TREE	370			
6/20/2018 17:13	HANCOCK	TOWN HILL	TREES OFF ROW-TREE	737			
7/2/2018 18:17	HANCOCK	TOWN HILL	TREES OFF ROW-TREE	1140			
8/7/2018 16:10	HANCOCK	TOWN HILL	TREES OFF ROW-TREE	262			
9/9/2018 13:56	HANCOCK	TOWN HILL	TREES - SEC/SERVICE	639			
9/27/2018 18:30	HANCOCK	TOWN HILL	TREES OFF ROW-TREE	407			
10/11/2018 12:56	HANCOCK	TOWN HILL	TREES OFF ROW-TREE	291			
10/17/2018 14:19	HANCOCK	TOWN HILL	TREES OFF ROW-TREE	1096			
11/27/2018 4:39	HANCOCK	TOWN HILL	TREES OFF ROW-TREE	105			
1/19/2019 21:43	HANCOCK	TOWN HILL	TREES OFF ROW-TREE	477			
2/12/2019 8:32	HANCOCK	TOWN HILL	TREES OFF ROW-TREE	235			
2/24/2019 16:00	HANCOCK	TOWN HILL	TREES OFF ROW-TREE	795			
2/24/2019 20:14	HANCOCK	TOWN HILL	TREES OFF ROW-TREE	152			
2/24/2019 17:10	HANCOCK	TOWN HILL	TREES OFF ROW-TREE	2436			
2/24/2019 19:43	HANCOCK	TOWN HILL	TREES OFF ROW-TREE	2047			
2/24/2019 17:08	HANCOCK	TOWN HILL	TREES OFF ROW-TREE	2062			
2/25/2019 7:20	HANCOCK	TOWN HILL	TREES OFF ROW-TREE	1060			
2/24/2019 19:21	HANCOCK	TOWN HILL	TREES OFF ROW-TREE	4093			
3/3/2019 11:35	HANCOCK	TOWN HILL	TREES OFF ROW-TREE	331			
3/10/2019 4:56	HANCOCK	TOWN HILL	TREES OFF ROW-TREE	468			
3/16/2019 12:41	HANCOCK	TOWN HILL	TREES OFF ROW-TREE	270			
4/9/2019 17:24	HANCOCK	TOWN HILL	TREES OFF ROW-TREE	251			
4/27/2019 10:38	HANCOCK	TOWN HILL	TREES OFF ROW-TREE	1559			
4/28/2019 19:24	HANCOCK	TOWN HILL	TREES OFF ROW-TREE	418			
4/29/2019 0:44	HANCOCK	TOWN HILL	TREES OFF ROW-TREE	98			
4/29/2019 6:45	HANCOCK	TOWN HILL	TREES OFF ROW-TREE	210			
5/10/2019 10:33	HANCOCK	TOWN HILL	TREES OFF ROW-TREE	308			
6/30/2019 7:10	HANCOCK	TOWN HILL	TREES OFF ROW-TREE	1138			
8/15/2019 8:48	HANCOCK	TOWN HILL	TREES OFF ROW-TREE	57			
11/28/2019 7:07	HANCOCK	TOWN HILL	TREES OFF ROW-TREE	162			
12/17/2019 6:15	HANCOCK	TOWN HILL	TREES ON ROW	4597			
12/17/2019 15:36	HANCOCK	TOWN HILL	TREES OFF ROW-TREE	2449			
12/26/2019 15:42	HANCOCK	TOWN HILL	TREES OFF ROW-LIMB	463			
3/3/2020 22:20	HANCOCK	TOWN HILL	TREES OFF ROW-TREE	782			
3/3/2020 22:40	HANCOCK	TOWN HILL	TREES OFF ROW-TREE	781			
3/5/2020 7:14	HANCOCK	TOWN HILL	TREES OFF ROW-TREE	120			
3/6/2020 1:27	HANCOCK	TOWN HILL	TREES OFF ROW-TREE	297			
4/9/2020 15:19	HANCOCK	TOWN HILL	TREES OFF ROW-TREE	336			
4/13/2020 15:30	HANCOCK	TOWN HILL	TREES OFF ROW-TREE	349			
4/22/2020 15:39	HANCOCK	TOWN HILL	TREES OFF ROW-TREE	111			
5/9/2020 14:42	HANCOCK	TOWN HILL	TREES OFF ROW-TREE	205			

THE POTOMAC EDISON COMPANY
DATA REQUEST OF OFFICE OF PEOPLE'S COUNSEL
ELECTRIC STORAGE PILOT

Discovery request submitted by: Office of People's Counsel

Discovery request set number: First

Response date: June 4, 2020

OPC-1.37

Please provide details on any outage events within the last five years at the Little Orleans location, including month, day (weekday/weekend), starting hour, and duration. Please provide this data in machine-readable spreadsheet format.

Response:

Please see the Company's response to OPC-1.37, Attachment A.

OPC # 1.37, Attachment A

Start Date	Substation	Circuit	Cause	Max Duration (min)
1/10/2016 14:08	GREAT CACAPON	LITTLE ORLEANS	Trees Off ROW-Tree	147
1/10/2016 22:04	GREAT CACAPON	LITTLE ORLEANS	TREES OFF ROW-TREE	420
6/24/2016 11:12	GREAT CACAPON	LITTLE ORLEANS	TREES ON ROW	158
11/30/2016 8:20	GREAT CACAPON	LITTLE ORLEANS	TREES OFF ROW-TREE	216
2/13/2017 13:48	GREAT CACAPON	LITTLE ORLEANS	TREES OFF ROW-TREE	1484
2/17/2017 7:36	GREAT CACAPON	LITTLE ORLEANS	TREES OFF ROW-TREE	324
3/13/2017 16:11	GREAT CACAPON	LITTLE ORLEANS	TREES OFF ROW-TREE	159
6/24/2017 12:04	GREAT CACAPON	LITTLE ORLEANS	TREES OFF ROW-TREE	356
8/13/2017 8:25	GREAT CACAPON	LITTLE ORLEANS	TREES OFF ROW-TREE	353
8/13/2017 15:18	GREAT CACAPON	LITTLE ORLEANS	TREES OFF ROW-TREE	164
9/1/2017 15:27	GREAT CACAPON	LITTLE ORLEANS	TREES OFF ROW-TREE	280
10/30/2017 15:17	GREAT CACAPON	LITTLE ORLEANS	TREES OFF ROW-LIMB	165
11/16/2017 10:36	GREAT CACAPON	LITTLE ORLEANS	TREES OFF ROW-TREE	253
11/20/2017 8:48	GREAT CACAPON	LITTLE ORLEANS	TREES OFF ROW-TREE	305
12/25/2017 4:34	GREAT CACAPON	LITTLE ORLEANS	TREES OFF ROW-TREE	564
2/11/2018 16:15	GREAT CACAPON	LITTLE ORLEANS	TREES OFF ROW-LIMB	176
3/2/2018 2:30	GREAT CACAPON	LITTLE ORLEANS	TREES OFF ROW-TREE	2250
3/3/2018 10:07	GREAT CACAPON	LITTLE ORLEANS	TREES OFF ROW-TREE	418
3/16/2018 9:06	GREAT CACAPON	LITTLE ORLEANS	TREES OFF ROW-TREE	225
4/4/2018 10:50	GREAT CACAPON	LITTLE ORLEANS	TREES OFF ROW-TREE	520
4/4/2018 15:10	GREAT CACAPON	LITTLE ORLEANS	TREES OFF ROW-TREE	260
5/17/2018 18:28	GREAT CACAPON	LITTLE ORLEANS	TREES OFF ROW-TREE	254
6/3/2018 7:34	GREAT CACAPON	LITTLE ORLEANS	TREES OFF ROW-TREE	286
6/3/2018 7:34	GREAT CACAPON	LITTLE ORLEANS	TREES OFF ROW-TREE	722
6/14/2018 15:56	GREAT CACAPON	LITTLE ORLEANS	TREES - SEC/SERVICE	288
6/22/2018 17:43	GREAT CACAPON	LITTLE ORLEANS	TREES OFF ROW-TREE	432
7/6/2018 16:26	GREAT CACAPON	LITTLE ORLEANS	TREES OFF ROW-TREE	529
7/30/2018 16:33	GREAT CACAPON	LITTLE ORLEANS	TREES OFF ROW-TREE	778
8/3/2018 20:29	GREAT CACAPON	LITTLE ORLEANS	TREES OFF ROW-LIMB	804
9/17/2018 14:29	GREAT CACAPON	LITTLE ORLEANS	TREES OFF ROW-TREE	120
9/27/2018 16:16	GREAT CACAPON	LITTLE ORLEANS	TREES OFF ROW-TREE	257
9/28/2018 0:29	GREAT CACAPON	LITTLE ORLEANS	TREES OFF ROW-TREE	383
10/12/2018 1:27	GREAT CACAPON	LITTLE ORLEANS	TREES OFF ROW-TREE	213
11/10/2018 9:25	GREAT CACAPON	LITTLE ORLEANS	TREES OFF ROW-TREE	269
11/15/2018 23:03	GREAT CACAPON	LITTLE ORLEANS	TREES OFF ROW-TREE	283
1/20/2019 0:21	GREAT CACAPON	LITTLE ORLEANS	TREES OFF ROW-TREE	219
2/5/2019 13:35	GREAT CACAPON	LITTLE ORLEANS	TREES OFF ROW-TREE	416
2/24/2019 15:53	GREAT CACAPON	LITTLE ORLEANS	TREES OFF ROW-TREE	4408
2/24/2019 16:04	GREAT CACAPON	LITTLE ORLEANS	TREES OFF ROW-TREE	1591
2/25/2019 9:03	GREAT CACAPON	LITTLE ORLEANS	TREES OFF ROW-TREE	402
2/24/2019 16:04	GREAT CACAPON	LITTLE ORLEANS	TREES OFF ROW-TREE	4319
3/13/2019 6:58	GREAT CACAPON	LITTLE ORLEANS	TREES OFF ROW-TREE	368
5/7/2019 6:43	GREAT CACAPON	LITTLE ORLEANS	TREES OFF ROW-TREE	225
5/19/2019 14:24	GREAT CACAPON	LITTLE ORLEANS	TREES OFF ROW-TREE	325
6/14/2019 3:54	GREAT CACAPON	LITTLE ORLEANS	TREES OFF ROW-TREE	321
10/31/2019 22:44	GREAT CACAPON	LITTLE ORLEANS	TREES OFF ROW-TREE	2347
5/10/2020 2:59	GREAT CACAPON	LITTLE ORLEANS	TREES OFF ROW-TREE	295
11/20/2016 12:53	GREAT CACAPON	LITTLE ORLEANS	TREES OFF ROW-TREE	297
11/24/2017 10:11	GREAT CACAPON	LITTLE ORLEANS	TREES OFF ROW-TREE	118
1/13/2018 4:09	GREAT CACAPON	LITTLE ORLEANS	TREES OFF ROW-TREE	192
3/2/2018 0:44	GREAT CACAPON	LITTLE ORLEANS	TREES OFF ROW-TREE	1040
12/15/2018 6:44	GREAT CACAPON	LITTLE ORLEANS	TREES OFF ROW-TREE	294

THE POTOMAC EDISON COMPANY
DATA REQUEST OF OFFICE OF STAFF'S COUNSEL
ELECTRIC STORAGE PILOT

Discovery request submitted by: Office of Staff's Counsel

Discovery request set number: Second

Response date: June 4, 2020

Staff-2.1

PUA 7-216 e 1(vi) states, "the estimated impact of each project on the investor–owned electric company's rates for each class of customer" must be included in the utility's application for the energy storage pilot. Please provide this bill impact comparing current rates to the rates if both projects were approved. If possible, please also provide the bill impact comparing rates of the approval of the two projects to rates that include all the avoided costs the energy storage projects allow PE to avoid. Please base this bill impact analysis on the billing determinates used in PE last base rate case proceeding. Please also describe how all rate base and costs were allocated to each customer class to determine the revenue requirement used to derive the bill impacts.

Response:

Please refer to Staff-2.1, Attachment A (Town Hill) and Staff-2.1, Attachment B (Little Orleans) for an estimated rate impact of each project. The estimated impact reflects a levelized rate design for the entire 10-year contract term. The estimated impact also includes the forecasted value from the wholesale PJM market, where applicable. Although avoided distribution construction costs are not a direct credit since such costs would not be included in a test year, a calculation is included to estimate the impact of the distribution construction costs had they not been avoided. The rate impact utilizes the weather normalized historical billing determinants from the last PE base rate proceeding. The allocation of rate base and costs is detailed within Staff-2.1, Attachment A and Staff-2.1, Attachment B.

THE POTOMAC EDISON COMPANY - MARYLAND
Town Hill Avoided Distribution Revenue Requirement Calculation

Capital	$ 1,710,000	*(per Potomac Edison petition dated April 15, 2020 in Case No. 9619)*
Reg Depreciation	2.45%	*(estimated 40.8 year life of weighted average distribution, per Staff Exhibit 23 referenced in PSC Order No. 89072 issued March 22, 2019 in Case No. 9490)*
Tax Life	20	years *(IRS Pub. 946, Table B-2)*
Annual O&M	$ 17,100	*(per Potomac Edison petition dated April 15, 2020 in Case No. 9619)*
Annual PJM Value	$ -	*(N/A)*

Year	Month	Capital Placed In-Service	Total Capital In-Service Month Ending	Regulatory Book Depreciation	Regulatory Depreciation Reserve	Net Plant	ADIT	Rate Base	Capital Revenue Requirement	TOIT: *Property Tax*	O&M	PJM Value	Total Revenue Requirement
			-										
2022	Jan-22	$ 1,710,000	$ 1,710,000	$ 1,746	$ 1,746	$ 1,708,254	$ (990)	$ 1,707,264	$ 14,673	$ 1,225	$ 1,425	$ -	$ 17,323
	Feb-22	$ -	$ 1,710,000	$ 3,491	$ 5,237	$ 1,704,763	$ (1,500)	$ 1,703,263	$ 16,388	$ 1,225	$ 1,425	$ -	$ 19,038
	Mar-22	$ -	$ 1,710,000	$ 3,491	$ 8,728	$ 1,701,272	$ (2,010)	$ 1,699,262	$ 16,358	$ 1,225	$ 1,425	$ -	$ 19,008
	Apr-22	$ -	$ 1,710,000	$ 3,491	$ 12,219	$ 1,697,781	$ (2,519)	$ 1,695,261	$ 16,327	$ 1,225	$ 1,425	$ -	$ 18,978
	May-22	$ -	$ 1,710,000	$ 3,491	$ 15,711	$ 1,694,289	$ (3,029)	$ 1,691,260	$ 16,297	$ 1,225	$ 1,425	$ -	$ 18,947
	Jun-22	$ -	$ 1,710,000	$ 3,491	$ 19,202	$ 1,690,798	$ (3,539)	$ 1,687,259	$ 16,267	$ 1,225	$ 1,425	$ -	$ 18,917
	Jul-22	$ -	$ 1,710,000	$ 3,491	$ 22,693	$ 1,687,307	$ (4,049)	$ 1,683,258	$ 16,237	$ 1,225	$ 1,425	$ -	$ 18,887
	Aug-22	$ -	$ 1,710,000	$ 3,491	$ 26,184	$ 1,683,816	$ (4,558)	$ 1,679,257	$ 16,206	$ 1,225	$ 1,425	$ -	$ 18,857
	Sep-22	$ -	$ 1,710,000	$ 3,491	$ 29,676	$ 1,680,324	$ (5,068)	$ 1,675,256	$ 16,176	$ 1,225	$ 1,425	$ -	$ 18,826
	Oct-22	$ -	$ 1,710,000	$ 3,491	$ 33,167	$ 1,676,833	$ (5,578)	$ 1,671,255	$ 16,146	$ 1,225	$ 1,425	$ -	$ 18,796
	Nov-22	$ -	$ 1,710,000	$ 3,491	$ 36,658	$ 1,673,342	$ (6,088)	$ 1,667,254	$ 16,115	$ 1,225	$ 1,425	$ -	$ 18,766
	Dec-22	$ -	$ 1,710,000	$ 3,491	$ 40,149	$ 1,669,851	$ (6,597)	$ 1,663,253	$ 16,085	$ 1,225	$ 1,425	$ -	$ 18,735
2023	Jan-23	$ -	$ 1,710,000	$ 3,491	$ 43,641	$ 1,666,359	$ (8,468)	$ 1,657,892	$ 16,045	$ 1,225	$ 1,425	$ -	$ 18,695
	Feb-23	$ -	$ 1,710,000	$ 3,491	$ 47,132	$ 1,662,868	$ (10,338)	$ 1,652,531	$ 16,004	$ 1,225	$ 1,425	$ -	$ 18,654
	Mar-23	$ -	$ 1,710,000	$ 3,491	$ 50,623	$ 1,659,377	$ (12,208)	$ 1,647,169	$ 15,963	$ 1,225	$ 1,425	$ -	$ 18,614
	Apr-23	$ -	$ 1,710,000	$ 3,491	$ 54,114	$ 1,655,886	$ (14,078)	$ 1,641,808	$ 15,923	$ 1,225	$ 1,425	$ -	$ 18,573
	May-23	$ -	$ 1,710,000	$ 3,491	$ 57,606	$ 1,652,394	$ (15,948)	$ 1,636,447	$ 15,882	$ 1,225	$ 1,425	$ -	$ 18,532
	Jun-23	$ -	$ 1,710,000	$ 3,491	$ 61,097	$ 1,648,903	$ (17,818)	$ 1,631,085	$ 15,842	$ 1,225	$ 1,425	$ -	$ 18,492
	Jul-23	$ -	$ 1,710,000	$ 3,491	$ 64,588	$ 1,645,412	$ (19,688)	$ 1,625,724	$ 15,801	$ 1,225	$ 1,425	$ -	$ 18,451
	Aug-23	$ -	$ 1,710,000	$ 3,491	$ 68,079	$ 1,641,921	$ (21,558)	$ 1,620,363	$ 15,760	$ 1,225	$ 1,425	$ -	$ 18,411
	Sep-23	$ -	$ 1,710,000	$ 3,491	$ 71,571	$ 1,638,429	$ (23,428)	$ 1,615,001	$ 15,720	$ 1,225	$ 1,425	$ -	$ 18,370
	Oct-23	$ -	$ 1,710,000	$ 3,491	$ 75,062	$ 1,634,938	$ (25,298)	$ 1,609,640	$ 15,679	$ 1,225	$ 1,425	$ -	$ 18,329
	Nov-23	$ -	$ 1,710,000	$ 3,491	$ 78,553	$ 1,631,447	$ (27,168)	$ 1,604,279	$ 15,639	$ 1,225	$ 1,425	$ -	$ 18,289
	Dec-23	$ -	$ 1,710,000	$ 3,491	$ 82,044	$ 1,627,956	$ (29,038)	$ 1,598,918	$ 15,598	$ 1,225	$ 1,425	$ -	$ 18,248
2024	Jan-24	$ -	$ 1,710,000	$ 3,491	$ 85,536	$ 1,624,464	$ (30,696)	$ 1,593,769	$ 15,559	$ 1,225	$ 1,425	$ -	$ 18,209
	Feb-24	$ -	$ 1,710,000	$ 3,491	$ 89,027	$ 1,620,973	$ (32,353)	$ 1,588,620	$ 15,520	$ 1,225	$ 1,425	$ -	$ 18,170
	Mar-24	$ -	$ 1,710,000	$ 3,491	$ 92,518	$ 1,617,482	$ (34,011)	$ 1,583,471	$ 15,481	$ 1,225	$ 1,425	$ -	$ 18,131
	Apr-24	$ -	$ 1,710,000	$ 3,491	$ 96,009	$ 1,613,991	$ (35,668)	$ 1,578,323	$ 15,442	$ 1,225	$ 1,425	$ -	$ 18,092
	May-24	$ -	$ 1,710,000	$ 3,491	$ 99,501	$ 1,610,499	$ (37,326)	$ 1,573,174	$ 15,403	$ 1,225	$ 1,425	$ -	$ 18,053
	Jun-24	$ -	$ 1,710,000	$ 3,491	$ 102,992	$ 1,607,008	$ (38,983)	$ 1,568,025	$ 15,364	$ 1,225	$ 1,425	$ -	$ 18,014
	Jul-24	$ -	$ 1,710,000	$ 3,491	$ 106,483	$ 1,603,517	$ (40,641)	$ 1,562,876	$ 15,325	$ 1,225	$ 1,425	$ -	$ 17,975
	Aug-24	$ -	$ 1,710,000	$ 3,491	$ 109,974	$ 1,600,026	$ (42,298)	$ 1,557,728	$ 15,286	$ 1,225	$ 1,425	$ -	$ 17,936
	Sep-24	$ -	$ 1,710,000	$ 3,491	$ 113,466	$ 1,596,534	$ (43,956)	$ 1,552,579	$ 15,247	$ 1,225	$ 1,425	$ -	$ 17,897
	Oct-24	$ -	$ 1,710,000	$ 3,491	$ 116,957	$ 1,593,043	$ (45,613)	$ 1,547,430	$ 15,208	$ 1,225	$ 1,425	$ -	$ 17,858
	Nov-24	$ -	$ 1,710,000	$ 3,491	$ 120,448	$ 1,589,552	$ (47,271)	$ 1,542,281	$ 15,169	$ 1,225	$ 1,425	$ -	$ 17,819
	Dec-24	$ -	$ 1,710,000	$ 3,491	$ 123,939	$ 1,586,061	$ (48,928)	$ 1,537,132	$ 15,130	$ 1,225	$ 1,425	$ -	$ 17,780
2025	Jan-25	$ -	$ 1,710,000	$ 3,491	$ 127,431	$ 1,582,569	$ (50,390)	$ 1,532,180	$ 15,093	$ 1,225	$ 1,425	$ -	$ 17,743
	Feb-25	$ -	$ 1,710,000	$ 3,491	$ 130,922	$ 1,579,078	$ (51,851)	$ 1,527,227	$ 15,055	$ 1,225	$ 1,425	$ -	$ 17,705
	Mar-25	$ -	$ 1,710,000	$ 3,491	$ 134,413	$ 1,575,587	$ (53,312)	$ 1,522,274	$ 15,018	$ 1,225	$ 1,425	$ -	$ 17,668
	Apr-25	$ -	$ 1,710,000	$ 3,491	$ 137,904	$ 1,572,096	$ (54,774)	$ 1,517,322	$ 14,980	$ 1,225	$ 1,425	$ -	$ 17,630
	May-25	$ -	$ 1,710,000	$ 3,491	$ 141,396	$ 1,568,604	$ (56,235)	$ 1,512,369	$ 14,943	$ 1,225	$ 1,425	$ -	$ 17,593
	Jun-25	$ -	$ 1,710,000	$ 3,491	$ 144,887	$ 1,565,113	$ (57,697)	$ 1,507,416	$ 14,905	$ 1,225	$ 1,425	$ -	$ 17,555
	Jul-25	$ -	$ 1,710,000	$ 3,491	$ 148,378	$ 1,561,622	$ (59,158)	$ 1,502,464	$ 14,868	$ 1,225	$ 1,425	$ -	$ 17,518
	Aug-25	$ -	$ 1,710,000	$ 3,491	$ 151,869	$ 1,558,131	$ (60,620)	$ 1,497,511	$ 14,830	$ 1,225	$ 1,425	$ -	$ 17,480

THE POTOMAC EDISON COMPANY - MARYLAND
Town Hill Avoided Distribution Revenue Requirement Calculation

Capital	$ 1,710,000	*(per Potomac Edison petition dated April 15, 2020 in Case No. 9619)*
Reg Depreciation	2.45%	*(estimated 40.8 year life of weighted average distribution, per Staff Exhibit 23 referenced in PSC Order No. 89072 issued March 22, 2019 in Case No. 9490)*
Tax Life	20	years *(IRS Pub. 946, Table B-2)*
Annual O&M	$ 17,100	*(per Potomac Edison petition dated April 15, 2020 in Case No. 9619)*
Annual PJM Value	$ -	*(N/A)*

Year	Month	Capital Placed In-Service	Total Capital In-Service Month Ending	Regulatory Book Depreciation	Regulatory Depreciation Reserve	Net Plant	ADIT	Rate Base	Capital Revenue Requirement	TOIT: *Property Tax*	O&M	PJM Value	Total Revenue Requirement
	Sep-25	$ -	$ 1,710,000	$ 3,491	$ 155,361	$ 1,554,639	$ (62,081)	$ 1,492,558	$ 14,793	$ 1,225	$ 1,425	$ -	$ 17,443
	Oct-25	$ -	$ 1,710,000	$ 3,491	$ 158,852	$ 1,551,148	$ (63,543)	$ 1,487,605	$ 14,755	$ 1,225	$ 1,425	$ -	$ 17,405
	Nov-25	$ -	$ 1,710,000	$ 3,491	$ 162,343	$ 1,547,657	$ (65,004)	$ 1,482,653	$ 14,718	$ 1,225	$ 1,425	$ -	$ 17,368
	Dec-25	$ -	$ 1,710,000	$ 3,491	$ 165,834	$ 1,544,166	$ (66,466)	$ 1,477,700	$ 14,680	$ 1,225	$ 1,425	$ -	$ 17,330
2026	Jan-26	$ -	$ 1,710,000	$ 3,491	$ 169,326	$ 1,540,674	$ (67,745)	$ 1,472,929	$ 14,644	$ 1,225	$ 1,425	$ -	$ 17,294
	Feb-26	$ -	$ 1,710,000	$ 3,491	$ 172,817	$ 1,537,183	$ (69,025)	$ 1,468,159	$ 14,608	$ 1,225	$ 1,425	$ -	$ 17,258
	Mar-26	$ -	$ 1,710,000	$ 3,491	$ 176,308	$ 1,533,692	$ (70,304)	$ 1,463,388	$ 14,572	$ 1,225	$ 1,425	$ -	$ 17,222
	Apr-26	$ -	$ 1,710,000	$ 3,491	$ 179,799	$ 1,530,201	$ (71,584)	$ 1,458,617	$ 14,536	$ 1,225	$ 1,425	$ -	$ 17,186
	May-26	$ -	$ 1,710,000	$ 3,491	$ 183,291	$ 1,526,709	$ (72,863)	$ 1,453,846	$ 14,500	$ 1,225	$ 1,425	$ -	$ 17,150
	Jun-26	$ -	$ 1,710,000	$ 3,491	$ 186,782	$ 1,523,218	$ (74,143)	$ 1,449,076	$ 14,463	$ 1,225	$ 1,425	$ -	$ 17,114
	Jul-26	$ -	$ 1,710,000	$ 3,491	$ 190,273	$ 1,519,727	$ (75,422)	$ 1,444,305	$ 14,427	$ 1,225	$ 1,425	$ -	$ 17,078
	Aug-26	$ -	$ 1,710,000	$ 3,491	$ 193,764	$ 1,516,236	$ (76,702)	$ 1,439,534	$ 14,391	$ 1,225	$ 1,425	$ -	$ 17,041
	Sep-26	$ -	$ 1,710,000	$ 3,491	$ 197,256	$ 1,512,744	$ (77,981)	$ 1,434,763	$ 14,355	$ 1,225	$ 1,425	$ -	$ 17,005
	Oct-26	$ -	$ 1,710,000	$ 3,491	$ 200,747	$ 1,509,253	$ (79,261)	$ 1,429,993	$ 14,319	$ 1,225	$ 1,425	$ -	$ 16,969
	Nov-26	$ -	$ 1,710,000	$ 3,491	$ 204,238	$ 1,505,762	$ (80,540)	$ 1,425,222	$ 14,283	$ 1,225	$ 1,425	$ -	$ 16,933
	Dec-26	$ -	$ 1,710,000	$ 3,491	$ 207,729	$ 1,502,271	$ (81,820)	$ 1,420,451	$ 14,247	$ 1,225	$ 1,425	$ -	$ 16,897
2027	Jan-27	$ -	$ 1,710,000	$ 3,491	$ 211,221	$ 1,498,779	$ (82,931)	$ 1,415,848	$ 14,212	$ 1,225	$ 1,425	$ -	$ 16,862
	Feb-27	$ -	$ 1,710,000	$ 3,491	$ 214,712	$ 1,495,288	$ (84,043)	$ 1,411,245	$ 14,177	$ 1,225	$ 1,425	$ -	$ 16,827
	Mar-27	$ -	$ 1,710,000	$ 3,491	$ 218,203	$ 1,491,797	$ (85,155)	$ 1,406,642	$ 14,142	$ 1,225	$ 1,425	$ -	$ 16,792
	Apr-27	$ -	$ 1,710,000	$ 3,491	$ 221,694	$ 1,488,306	$ (86,266)	$ 1,402,039	$ 14,107	$ 1,225	$ 1,425	$ -	$ 16,758
	May-27	$ -	$ 1,710,000	$ 3,491	$ 225,186	$ 1,484,814	$ (87,378)	$ 1,397,436	$ 14,072	$ 1,225	$ 1,425	$ -	$ 16,723
	Jun-27	$ -	$ 1,710,000	$ 3,491	$ 228,677	$ 1,481,323	$ (88,490)	$ 1,392,834	$ 14,038	$ 1,225	$ 1,425	$ -	$ 16,688
	Jul-27	$ -	$ 1,710,000	$ 3,491	$ 232,168	$ 1,477,832	$ (89,601)	$ 1,388,231	$ 14,003	$ 1,225	$ 1,425	$ -	$ 16,653
	Aug-27	$ -	$ 1,710,000	$ 3,491	$ 235,659	$ 1,474,341	$ (90,713)	$ 1,383,628	$ 13,968	$ 1,225	$ 1,425	$ -	$ 16,618
	Sep-27	$ -	$ 1,710,000	$ 3,491	$ 239,151	$ 1,470,849	$ (91,825)	$ 1,379,025	$ 13,933	$ 1,225	$ 1,425	$ -	$ 16,583
	Oct-27	$ -	$ 1,710,000	$ 3,491	$ 242,642	$ 1,467,358	$ (92,936)	$ 1,374,422	$ 13,898	$ 1,225	$ 1,425	$ -	$ 16,548
	Nov-27	$ -	$ 1,710,000	$ 3,491	$ 246,133	$ 1,463,867	$ (94,048)	$ 1,369,819	$ 13,863	$ 1,225	$ 1,425	$ -	$ 16,514
	Dec-27	$ -	$ 1,710,000	$ 3,491	$ 249,624	$ 1,460,376	$ (95,160)	$ 1,365,216	$ 13,828	$ 1,225	$ 1,425	$ -	$ 16,479
2028	Jan-28	$ -	$ 1,710,000	$ 3,491	$ 253,116	$ 1,456,884	$ (96,116)	$ 1,360,769	$ 13,795	$ 1,225	$ 1,425	$ -	$ 16,445
	Feb-28	$ -	$ 1,710,000	$ 3,491	$ 256,607	$ 1,453,393	$ (97,072)	$ 1,356,321	$ 13,761	$ 1,225	$ 1,425	$ -	$ 16,411
	Mar-28	$ -	$ 1,710,000	$ 3,491	$ 260,098	$ 1,449,902	$ (98,028)	$ 1,351,874	$ 13,727	$ 1,225	$ 1,425	$ -	$ 16,378
	Apr-28	$ -	$ 1,710,000	$ 3,491	$ 263,589	$ 1,446,411	$ (98,984)	$ 1,347,427	$ 13,694	$ 1,225	$ 1,425	$ -	$ 16,344
	May-28	$ -	$ 1,710,000	$ 3,491	$ 267,081	$ 1,442,919	$ (99,940)	$ 1,342,980	$ 13,660	$ 1,225	$ 1,425	$ -	$ 16,310
	Jun-28	$ -	$ 1,710,000	$ 3,491	$ 270,572	$ 1,439,428	$ (100,896)	$ 1,338,532	$ 13,626	$ 1,225	$ 1,425	$ -	$ 16,277
	Jul-28	$ -	$ 1,710,000	$ 3,491	$ 274,063	$ 1,435,937	$ (101,852)	$ 1,334,085	$ 13,593	$ 1,225	$ 1,425	$ -	$ 16,243
	Aug-28	$ -	$ 1,710,000	$ 3,491	$ 277,554	$ 1,432,446	$ (102,808)	$ 1,329,638	$ 13,559	$ 1,225	$ 1,425	$ -	$ 16,209
	Sep-28	$ -	$ 1,710,000	$ 3,491	$ 281,046	$ 1,428,954	$ (103,764)	$ 1,325,191	$ 13,525	$ 1,225	$ 1,425	$ -	$ 16,176
	Oct-28	$ -	$ 1,710,000	$ 3,491	$ 284,537	$ 1,425,463	$ (104,720)	$ 1,320,743	$ 13,492	$ 1,225	$ 1,425	$ -	$ 16,142
	Nov-28	$ -	$ 1,710,000	$ 3,491	$ 288,028	$ 1,421,972	$ (105,676)	$ 1,316,296	$ 13,458	$ 1,225	$ 1,425	$ -	$ 16,108
	Dec-28	$ -	$ 1,710,000	$ 3,491	$ 291,519	$ 1,418,481	$ (106,632)	$ 1,311,849	$ 13,424	$ 1,225	$ 1,425	$ -	$ 16,075
2029	Jan-29	$ -	$ 1,710,000	$ 3,491	$ 295,011	$ 1,414,989	$ (107,444)	$ 1,307,545	$ 13,392	$ 1,225	$ 1,425	$ -	$ 16,042
	Feb-29	$ -	$ 1,710,000	$ 3,491	$ 298,502	$ 1,411,498	$ (108,257)	$ 1,303,242	$ 13,359	$ 1,225	$ 1,425	$ -	$ 16,009
	Mar-29	$ -	$ 1,710,000	$ 3,491	$ 301,993	$ 1,408,007	$ (109,069)	$ 1,298,938	$ 13,327	$ 1,225	$ 1,425	$ -	$ 15,977
	Apr-29	$ -	$ 1,710,000	$ 3,491	$ 305,484	$ 1,404,516	$ (109,882)	$ 1,294,634	$ 13,294	$ 1,225	$ 1,425	$ -	$ 15,944
	May-29	$ -	$ 1,710,000	$ 3,491	$ 308,976	$ 1,401,024	$ (110,694)	$ 1,290,330	$ 13,261	$ 1,225	$ 1,425	$ -	$ 15,912

THE POTOMAC EDISON COMPANY - MARYLAND
Town Hill Avoided Distribution Revenue Requirement Calculation

Capital	$ 1,710,000	*(per Potomac Edison petition dated April 15, 2020 in Case No. 9619)*
Reg Depreciation	2.45%	*(estimated 40.8 year life of weighted average distribution, per Staff Exhibit 23 referenced in PSC Order No. 89072 issued March 22, 2019 in Case No. 9490)*
Tax Life	20	years *(IRS Pub. 946, Table B-2)*
Annual O&M	$ 17,100	*(per Potomac Edison petition dated April 15, 2020 in Case No. 9619)*
Annual PJM Value	$ -	*(N/A)*

Year	Month	Capital Placed In-Service	Total Capital In-Service Month Ending	Regulatory Book Depreciation	Regulatory Depreciation Reserve	Net Plant	ADIT	Rate Base	Capital Revenue Requirement	TOIT: *Property Tax*	O&M	PJM Value	Total Revenue Requirement
	Jun-29	$ -	$ 1,710,000	$ 3,491	$ 312,467	$ 1,397,533	$ (111,507)	$ 1,286,027	$ 13,229	$ 1,225	$ 1,425	$ -	$ 15,879
	Jul-29	$ -	$ 1,710,000	$ 3,491	$ 315,958	$ 1,394,042	$ (112,319)	$ 1,281,723	$ 13,196	$ 1,225	$ 1,425	$ -	$ 15,847
	Aug-29	$ -	$ 1,710,000	$ 3,491	$ 319,449	$ 1,390,551	$ (113,131)	$ 1,277,419	$ 13,164	$ 1,225	$ 1,425	$ -	$ 15,814
	Sep-29	$ -	$ 1,710,000	$ 3,491	$ 322,941	$ 1,387,059	$ (113,944)	$ 1,273,115	$ 13,131	$ 1,225	$ 1,425	$ -	$ 15,781
	Oct-29	$ -	$ 1,710,000	$ 3,491	$ 326,432	$ 1,383,568	$ (114,756)	$ 1,268,812	$ 13,098	$ 1,225	$ 1,425	$ -	$ 15,749
	Nov-29	$ -	$ 1,710,000	$ 3,491	$ 329,923	$ 1,380,077	$ (115,569)	$ 1,264,508	$ 13,066	$ 1,225	$ 1,425	$ -	$ 15,716
	Dec-29	$ -	$ 1,710,000	$ 3,491	$ 333,414	$ 1,376,586	$ (116,381)	$ 1,260,204	$ 13,033	$ 1,225	$ 1,425	$ -	$ 15,684
2030	Jan-30	$ -	$ 1,710,000	$ 3,491	$ 336,906	$ 1,373,094	$ (117,170)	$ 1,255,924	$ 13,001	$ 1,225	$ 1,425	$ -	$ 15,651
	Feb-30	$ -	$ 1,710,000	$ 3,491	$ 340,397	$ 1,369,603	$ (117,959)	$ 1,251,644	$ 12,968	$ 1,225	$ 1,425	$ -	$ 15,619
	Mar-30	$ -	$ 1,710,000	$ 3,491	$ 343,888	$ 1,366,112	$ (118,748)	$ 1,247,364	$ 12,936	$ 1,225	$ 1,425	$ -	$ 15,586
	Apr-30	$ -	$ 1,710,000	$ 3,491	$ 347,379	$ 1,362,621	$ (119,537)	$ 1,243,083	$ 12,904	$ 1,225	$ 1,425	$ -	$ 15,554
	May-30	$ -	$ 1,710,000	$ 3,491	$ 350,871	$ 1,359,129	$ (120,326)	$ 1,238,803	$ 12,871	$ 1,225	$ 1,425	$ -	$ 15,522
	Jun-30	$ -	$ 1,710,000	$ 3,491	$ 354,362	$ 1,355,638	$ (121,115)	$ 1,234,523	$ 12,839	$ 1,225	$ 1,425	$ -	$ 15,489
	Jul-30	$ -	$ 1,710,000	$ 3,491	$ 357,853	$ 1,352,147	$ (121,904)	$ 1,230,243	$ 12,806	$ 1,225	$ 1,425	$ -	$ 15,457
	Aug-30	$ -	$ 1,710,000	$ 3,491	$ 361,344	$ 1,348,656	$ (122,693)	$ 1,225,963	$ 12,774	$ 1,225	$ 1,425	$ -	$ 15,424
	Sep-30	$ -	$ 1,710,000	$ 3,491	$ 364,836	$ 1,345,164	$ (123,482)	$ 1,221,682	$ 12,742	$ 1,225	$ 1,425	$ -	$ 15,392
	Oct-30	$ -	$ 1,710,000	$ 3,491	$ 368,327	$ 1,341,673	$ (124,271)	$ 1,217,402	$ 12,709	$ 1,225	$ 1,425	$ -	$ 15,360
	Nov-30	$ -	$ 1,710,000	$ 3,491	$ 371,818	$ 1,338,182	$ (125,060)	$ 1,213,122	$ 12,677	$ 1,225	$ 1,425	$ -	$ 15,327
	Dec-30	$ -	$ 1,710,000	$ 3,491	$ 375,309	$ 1,334,691	$ (125,849)	$ 1,208,842	$ 12,644	$ 1,225	$ 1,425	$ -	$ 15,295
2031	Jan-31	$ -	$ 1,710,000	$ 3,491	$ 378,801	$ 1,331,199	$ (126,637)	$ 1,204,562	$ 12,612	$ 1,225	$ 1,425	$ -	$ 15,262
	Feb-31	$ -	$ 1,710,000	$ 3,491	$ 382,292	$ 1,327,708	$ (127,426)	$ 1,200,282	$ 12,580	$ 1,225	$ 1,425	$ -	$ 15,230
	Mar-31	$ -	$ 1,710,000	$ 3,491	$ 385,783	$ 1,324,217	$ (128,215)	$ 1,196,002	$ 12,547	$ 1,225	$ 1,425	$ -	$ 15,197
	Apr-31	$ -	$ 1,710,000	$ 3,491	$ 389,274	$ 1,320,726	$ (129,003)	$ 1,191,722	$ 12,515	$ 1,225	$ 1,425	$ -	$ 15,165
	May-31	$ -	$ 1,710,000	$ 3,491	$ 392,766	$ 1,317,234	$ (129,792)	$ 1,187,443	$ 12,482	$ 1,225	$ 1,425	$ -	$ 15,133
	Jun-31	$ -	$ 1,710,000	$ 3,491	$ 396,257	$ 1,313,743	$ (130,580)	$ 1,183,163	$ 12,450	$ 1,225	$ 1,425	$ -	$ 15,100
	Jul-31	$ -	$ 1,710,000	$ 3,491	$ 399,748	$ 1,310,252	$ (131,369)	$ 1,178,883	$ 12,418	$ 1,225	$ 1,425	$ -	$ 15,068
	Aug-31	$ -	$ 1,710,000	$ 3,491	$ 403,239	$ 1,306,761	$ (132,157)	$ 1,174,603	$ 12,385	$ 1,225	$ 1,425	$ -	$ 15,035
	Sep-31	$ -	$ 1,710,000	$ 3,491	$ 406,731	$ 1,303,269	$ (132,946)	$ 1,170,323	$ 12,353	$ 1,225	$ 1,425	$ -	$ 15,003
	Oct-31	$ -	$ 1,710,000	$ 3,491	$ 410,222	$ 1,299,778	$ (133,735)	$ 1,166,044	$ 12,320	$ 1,225	$ 1,425	$ -	$ 14,971
	Nov-31	$ -	$ 1,710,000	$ 3,491	$ 413,713	$ 1,296,287	$ (134,523)	$ 1,161,764	$ 12,288	$ 1,225	$ 1,425	$ -	$ 14,938
	Dec-31	$ -	$ 1,710,000	$ 3,491	$ 417,204	$ 1,292,796	$ (135,312)	$ 1,157,484	$ 12,256	$ 1,225	$ 1,425	$ -	$ 14,906
Total		$ 1,710,000											NPV (10-
													Levelized Monthly Revenue Requir
													Levelized Annual Revenue Requir

THE POTOMAC EDISON C
Town Hill Avoided Distrib

Capital
Reg Depreciation
Tax Life
Annual O&M
Annual PJM Value

Year	Month	Total Before Present Value	Present Value	# of Periods	Total Before Present Value: *Allocated Capital*	Present Value: *Allocated Capital*	Total Before Present Value: *Allocated Property Tax*	Present Value: *Allocated Property Tax*	Total Before Present Value: *Allocated O&M*	Present Value: *Allocated O&M*	Total Before Present Value: *PJM Value*	Present Value: *PJM Value*
2022	Jan-22	$ 17,323	$ 17,220	1	$ 14,673	$ 14,586	$ 1,225	$ 1,218	$ 1,425	$ 1,417	$ -	$ -
	Feb-22	$ 19,038	$ 18,814	2	$ 16,388	$ 16,194	$ 1,225	$ 1,211	$ 1,425	$ 1,408	$ -	$ -
	Mar-22	$ 19,008	$ 18,672	3	$ 16,358	$ 16,069	$ 1,225	$ 1,204	$ 1,425	$ 1,400	$ -	$ -
	Apr-22	$ 18,978	$ 18,532	4	$ 16,327	$ 15,944	$ 1,225	$ 1,197	$ 1,425	$ 1,392	$ -	$ -
	May-22	$ 18,947	$ 18,393	5	$ 16,297	$ 15,820	$ 1,225	$ 1,189	$ 1,425	$ 1,383	$ -	$ -
	Jun-22	$ 18,917	$ 18,255	6	$ 16,267	$ 15,697	$ 1,225	$ 1,182	$ 1,425	$ 1,375	$ -	$ -
	Jul-22	$ 18,887	$ 18,118	7	$ 16,237	$ 15,575	$ 1,225	$ 1,175	$ 1,425	$ 1,367	$ -	$ -
	Aug-22	$ 18,857	$ 17,981	8	$ 16,206	$ 15,454	$ 1,225	$ 1,168	$ 1,425	$ 1,359	$ -	$ -
	Sep-22	$ 18,826	$ 17,846	9	$ 16,176	$ 15,334	$ 1,225	$ 1,162	$ 1,425	$ 1,351	$ -	$ -
	Oct-22	$ 18,796	$ 17,712	10	$ 16,146	$ 15,214	$ 1,225	$ 1,155	$ 1,425	$ 1,343	$ -	$ -
	Nov-22	$ 18,766	$ 17,579	11	$ 16,115	$ 15,096	$ 1,225	$ 1,148	$ 1,425	$ 1,335	$ -	$ -
	Dec-22	$ 18,735	$ 17,446	12	$ 16,085	$ 14,978	$ 1,225	$ 1,141	$ 1,425	$ 1,327	$ -	$ -
2023	Jan-23	$ 18,695	$ 17,305	13	$ 16,045	$ 14,852	$ 1,225	$ 1,134	$ 1,425	$ 1,319	$ -	$ -
	Feb-23	$ 18,654	$ 17,166	14	$ 16,004	$ 14,727	$ 1,225	$ 1,128	$ 1,425	$ 1,311	$ -	$ -
	Mar-23	$ 18,614	$ 17,027	15	$ 15,963	$ 14,602	$ 1,225	$ 1,121	$ 1,425	$ 1,304	$ -	$ -
	Apr-23	$ 18,573	$ 16,889	16	$ 15,923	$ 14,479	$ 1,225	$ 1,114	$ 1,425	$ 1,296	$ -	$ -
	May-23	$ 18,532	$ 16,752	17	$ 15,882	$ 14,357	$ 1,225	$ 1,108	$ 1,425	$ 1,288	$ -	$ -
	Jun-23	$ 18,492	$ 16,617	18	$ 15,842	$ 14,235	$ 1,225	$ 1,101	$ 1,425	$ 1,280	$ -	$ -
	Jul-23	$ 18,451	$ 16,482	19	$ 15,801	$ 14,114	$ 1,225	$ 1,095	$ 1,425	$ 1,273	$ -	$ -
	Aug-23	$ 18,411	$ 16,348	20	$ 15,760	$ 13,995	$ 1,225	$ 1,088	$ 1,425	$ 1,265	$ -	$ -
	Sep-23	$ 18,370	$ 16,216	21	$ 15,720	$ 13,876	$ 1,225	$ 1,082	$ 1,425	$ 1,258	$ -	$ -
	Oct-23	$ 18,329	$ 16,084	22	$ 15,679	$ 13,758	$ 1,225	$ 1,075	$ 1,425	$ 1,250	$ -	$ -
	Nov-23	$ 18,289	$ 15,953	23	$ 15,639	$ 13,641	$ 1,225	$ 1,069	$ 1,425	$ 1,243	$ -	$ -
	Dec-23	$ 18,248	$ 15,823	24	$ 15,598	$ 13,525	$ 1,225	$ 1,063	$ 1,425	$ 1,236	$ -	$ -
2024	Jan-24	$ 18,209	$ 15,696	25	$ 15,559	$ 13,412	$ 1,225	$ 1,056	$ 1,425	$ 1,228	$ -	$ -
	Feb-24	$ 18,170	$ 15,570	26	$ 15,520	$ 13,299	$ 1,225	$ 1,050	$ 1,425	$ 1,221	$ -	$ -
	Mar-24	$ 18,131	$ 15,444	27	$ 15,481	$ 13,187	$ 1,225	$ 1,044	$ 1,425	$ 1,214	$ -	$ -
	Apr-24	$ 18,092	$ 15,320	28	$ 15,442	$ 13,076	$ 1,225	$ 1,038	$ 1,425	$ 1,207	$ -	$ -
	May-24	$ 18,053	$ 15,196	29	$ 15,403	$ 12,965	$ 1,225	$ 1,031	$ 1,425	$ 1,199	$ -	$ -
	Jun-24	$ 18,014	$ 15,074	30	$ 15,364	$ 12,856	$ 1,225	$ 1,025	$ 1,425	$ 1,192	$ -	$ -
	Jul-24	$ 17,975	$ 14,952	31	$ 15,325	$ 12,747	$ 1,225	$ 1,019	$ 1,425	$ 1,185	$ -	$ -
	Aug-24	$ 17,936	$ 14,831	32	$ 15,286	$ 12,640	$ 1,225	$ 1,013	$ 1,425	$ 1,178	$ -	$ -
	Sep-24	$ 17,897	$ 14,711	33	$ 15,247	$ 12,533	$ 1,225	$ 1,007	$ 1,425	$ 1,171	$ -	$ -
	Oct-24	$ 17,858	$ 14,592	34	$ 15,208	$ 12,427	$ 1,225	$ 1,001	$ 1,425	$ 1,164	$ -	$ -
	Nov-24	$ 17,819	$ 14,474	35	$ 15,169	$ 12,321	$ 1,225	$ 995	$ 1,425	$ 1,157	$ -	$ -
	Dec-24	$ 17,780	$ 14,357	36	$ 15,130	$ 12,217	$ 1,225	$ 989	$ 1,425	$ 1,151	$ -	$ -
2025	Jan-25	$ 17,743	$ 14,242	37	$ 15,093	$ 12,114	$ 1,225	$ 984	$ 1,425	$ 1,144	$ -	$ -
	Feb-25	$ 17,705	$ 14,128	38	$ 15,055	$ 12,013	$ 1,225	$ 978	$ 1,425	$ 1,137	$ -	$ -
	Mar-25	$ 17,668	$ 14,014	39	$ 15,018	$ 11,912	$ 1,225	$ 972	$ 1,425	$ 1,130	$ -	$ -
	Apr-25	$ 17,630	$ 13,902	40	$ 14,980	$ 11,812	$ 1,225	$ 966	$ 1,425	$ 1,124	$ -	$ -
	May-25	$ 17,593	$ 13,790	41	$ 14,943	$ 11,712	$ 1,225	$ 960	$ 1,425	$ 1,117	$ -	$ -
	Jun-25	$ 17,555	$ 13,679	42	$ 14,905	$ 11,614	$ 1,225	$ 955	$ 1,425	$ 1,110	$ -	$ -
	Jul-25	$ 17,518	$ 13,569	43	$ 14,868	$ 11,516	$ 1,225	$ 949	$ 1,425	$ 1,104	$ -	$ -
	Aug-25	$ 17,480	$ 13,460	44	$ 14,830	$ 11,419	$ 1,225	$ 943	$ 1,425	$ 1,097	$ -	$ -

THE POTOMAC EDISON C
Town Hill Avoided Distrib

Capital
Reg Depreciation
Tax Life
Annual O&M
Annual PJM Value

Year	Month	Total Before Present Value	Present Value	# of Periods	Total Before Present Value: *Allocated Capital*	Present Value: *Allocated Capital*	Total Before Present Value: *Allocated Property Tax*	Present Value: *Allocated Property Tax*	Total Before Present Value: *Allocated O&M*	Present Value: *Allocated O&M*	Total Before Present Value: *PJM Value*	Present Value: *PJM Value*
	Sep-25	$ 17,443	$ 13,351	45	$ 14,793	$ 11,323	$ 1,225	$ 938	$ 1,425	$ 1,091	$ -	$ -
	Oct-25	$ 17,405	$ 13,244	46	$ 14,755	$ 11,227	$ 1,225	$ 932	$ 1,425	$ 1,084	$ -	$ -
	Nov-25	$ 17,368	$ 13,137	47	$ 14,718	$ 11,132	$ 1,225	$ 927	$ 1,425	$ 1,078	$ -	$ -
	Dec-25	$ 17,330	$ 13,031	48	$ 14,680	$ 11,038	$ 1,225	$ 921	$ 1,425	$ 1,071	$ -	$ -
2026	Jan-26	$ 17,294	$ 12,927	49	$ 14,644	$ 10,946	$ 1,225	$ 916	$ 1,425	$ 1,065	$ -	$ -
	Feb-26	$ 17,258	$ 12,823	50	$ 14,608	$ 10,854	$ 1,225	$ 910	$ 1,425	$ 1,059	$ -	$ -
	Mar-26	$ 17,222	$ 12,721	51	$ 14,572	$ 10,763	$ 1,225	$ 905	$ 1,425	$ 1,053	$ -	$ -
	Apr-26	$ 17,186	$ 12,619	52	$ 14,536	$ 10,673	$ 1,225	$ 900	$ 1,425	$ 1,046	$ -	$ -
	May-26	$ 17,150	$ 12,518	53	$ 14,500	$ 10,583	$ 1,225	$ 894	$ 1,425	$ 1,040	$ -	$ -
	Jun-26	$ 17,114	$ 12,417	54	$ 14,463	$ 10,494	$ 1,225	$ 889	$ 1,425	$ 1,034	$ -	$ -
	Jul-26	$ 17,078	$ 12,318	55	$ 14,427	$ 10,406	$ 1,225	$ 884	$ 1,425	$ 1,028	$ -	$ -
	Aug-26	$ 17,041	$ 12,219	56	$ 14,391	$ 10,318	$ 1,225	$ 879	$ 1,425	$ 1,022	$ -	$ -
	Sep-26	$ 17,005	$ 12,121	57	$ 14,355	$ 10,232	$ 1,225	$ 873	$ 1,425	$ 1,016	$ -	$ -
	Oct-26	$ 16,969	$ 12,023	58	$ 14,319	$ 10,145	$ 1,225	$ 868	$ 1,425	$ 1,010	$ -	$ -
	Nov-26	$ 16,933	$ 11,927	59	$ 14,283	$ 10,060	$ 1,225	$ 863	$ 1,425	$ 1,004	$ -	$ -
	Dec-26	$ 16,897	$ 11,831	60	$ 14,247	$ 9,975	$ 1,225	$ 858	$ 1,425	$ 998	$ -	$ -
2027	Jan-27	$ 16,862	$ 11,736	61	$ 14,212	$ 9,892	$ 1,225	$ 853	$ 1,425	$ 992	$ -	$ -
	Feb-27	$ 16,827	$ 11,643	62	$ 14,177	$ 9,809	$ 1,225	$ 848	$ 1,425	$ 986	$ -	$ -
	Mar-27	$ 16,792	$ 11,550	63	$ 14,142	$ 9,727	$ 1,225	$ 843	$ 1,425	$ 980	$ -	$ -
	Apr-27	$ 16,758	$ 11,458	64	$ 14,107	$ 9,645	$ 1,225	$ 838	$ 1,425	$ 974	$ -	$ -
	May-27	$ 16,723	$ 11,366	65	$ 14,072	$ 9,565	$ 1,225	$ 833	$ 1,425	$ 969	$ -	$ -
	Jun-27	$ 16,688	$ 11,275	66	$ 14,038	$ 9,484	$ 1,225	$ 828	$ 1,425	$ 963	$ -	$ -
	Jul-27	$ 16,653	$ 11,185	67	$ 14,003	$ 9,405	$ 1,225	$ 823	$ 1,425	$ 957	$ -	$ -
	Aug-27	$ 16,618	$ 11,095	68	$ 13,968	$ 9,326	$ 1,225	$ 818	$ 1,425	$ 951	$ -	$ -
	Sep-27	$ 16,583	$ 11,007	69	$ 13,933	$ 9,247	$ 1,225	$ 813	$ 1,425	$ 946	$ -	$ -
	Oct-27	$ 16,548	$ 10,918	70	$ 13,898	$ 9,170	$ 1,225	$ 808	$ 1,425	$ 940	$ -	$ -
	Nov-27	$ 16,514	$ 10,831	71	$ 13,863	$ 9,093	$ 1,225	$ 804	$ 1,425	$ 935	$ -	$ -
	Dec-27	$ 16,479	$ 10,744	72	$ 13,828	$ 9,016	$ 1,225	$ 799	$ 1,425	$ 929	$ -	$ -
2028	Jan-28	$ 16,445	$ 10,659	73	$ 13,795	$ 8,941	$ 1,225	$ 794	$ 1,425	$ 924	$ -	$ -
	Feb-28	$ 16,411	$ 10,574	74	$ 13,761	$ 8,866	$ 1,225	$ 789	$ 1,425	$ 918	$ -	$ -
	Mar-28	$ 16,378	$ 10,489	75	$ 13,727	$ 8,792	$ 1,225	$ 785	$ 1,425	$ 913	$ -	$ -
	Apr-28	$ 16,344	$ 10,406	76	$ 13,694	$ 8,719	$ 1,225	$ 780	$ 1,425	$ 907	$ -	$ -
	May-28	$ 16,310	$ 10,323	77	$ 13,660	$ 8,646	$ 1,225	$ 776	$ 1,425	$ 902	$ -	$ -
	Jun-28	$ 16,277	$ 10,241	78	$ 13,626	$ 8,573	$ 1,225	$ 771	$ 1,425	$ 897	$ -	$ -
	Jul-28	$ 16,243	$ 10,159	79	$ 13,593	$ 8,501	$ 1,225	$ 766	$ 1,425	$ 891	$ -	$ -
	Aug-28	$ 16,209	$ 10,078	80	$ 13,559	$ 8,430	$ 1,225	$ 762	$ 1,425	$ 886	$ -	$ -
	Sep-28	$ 16,176	$ 9,997	81	$ 13,525	$ 8,359	$ 1,225	$ 757	$ 1,425	$ 881	$ -	$ -
	Oct-28	$ 16,142	$ 9,917	82	$ 13,492	$ 8,289	$ 1,225	$ 753	$ 1,425	$ 875	$ -	$ -
	Nov-28	$ 16,108	$ 9,838	83	$ 13,458	$ 8,219	$ 1,225	$ 748	$ 1,425	$ 870	$ -	$ -
	Dec-28	$ 16,075	$ 9,759	84	$ 13,424	$ 8,150	$ 1,225	$ 744	$ 1,425	$ 865	$ -	$ -
2029	Jan-29	$ 16,042	$ 9,682	85	$ 13,392	$ 8,082	$ 1,225	$ 740	$ 1,425	$ 860	$ -	$ -
	Feb-29	$ 16,009	$ 9,605	86	$ 13,359	$ 8,015	$ 1,225	$ 735	$ 1,425	$ 855	$ -	$ -
	Mar-29	$ 15,977	$ 9,529	87	$ 13,327	$ 7,948	$ 1,225	$ 731	$ 1,425	$ 850	$ -	$ -
	Apr-29	$ 15,944	$ 9,453	88	$ 13,294	$ 7,882	$ 1,225	$ 726	$ 1,425	$ 845	$ -	$ -
	May-29	$ 15,912	$ 9,378	89	$ 13,261	$ 7,816	$ 1,225	$ 722	$ 1,425	$ 840	$ -	$ -

THE POTOMAC EDISON C
Town Hill Avoided Distrib

Capital
Reg Depreciation
Tax Life
Annual O&M
Annual PJM Value

Year	Month	Total Before Present Value	Present Value	# of Periods	Total Before Present Value: *Allocated Capital*	Present Value: *Allocated Capital*	Total Before Present Value: *Allocated Property Tax*	Present Value: *Allocated Property Tax*	Total Before Present Value: *Allocated O&M*	Present Value: *Allocated O&M*	Total Before Present Value: *PJM Value*	Present Value: *PJM Value*
	Jun-29	$ 15,879	$ 9,303	90	$ 13,229	$ 7,750	$ 1,225	$ 718	$ 1,425	$ 835	$ -	$ -
	Jul-29	$ 15,847	$ 9,229	91	$ 13,196	$ 7,685	$ 1,225	$ 714	$ 1,425	$ 830	$ -	$ -
	Aug-29	$ 15,814	$ 9,155	92	$ 13,164	$ 7,621	$ 1,225	$ 709	$ 1,425	$ 825	$ -	$ -
	Sep-29	$ 15,781	$ 9,083	93	$ 13,131	$ 7,557	$ 1,225	$ 705	$ 1,425	$ 820	$ -	$ -
	Oct-29	$ 15,749	$ 9,010	94	$ 13,098	$ 7,494	$ 1,225	$ 701	$ 1,425	$ 815	$ -	$ -
	Nov-29	$ 15,716	$ 8,938	95	$ 13,066	$ 7,431	$ 1,225	$ 697	$ 1,425	$ 810	$ -	$ -
	Dec-29	$ 15,684	$ 8,867	96	$ 13,033	$ 7,368	$ 1,225	$ 693	$ 1,425	$ 806	$ -	$ -
2030	Jan-30	$ 15,651	$ 8,796	97	$ 13,001	$ 7,307	$ 1,225	$ 689	$ 1,425	$ 801	$ -	$ -
	Feb-30	$ 15,619	$ 8,726	98	$ 12,968	$ 7,245	$ 1,225	$ 685	$ 1,425	$ 796	$ -	$ -
	Mar-30	$ 15,586	$ 8,656	99	$ 12,936	$ 7,184	$ 1,225	$ 681	$ 1,425	$ 791	$ -	$ -
	Apr-30	$ 15,554	$ 8,587	100	$ 12,904	$ 7,124	$ 1,225	$ 676	$ 1,425	$ 787	$ -	$ -
	May-30	$ 15,522	$ 8,518	101	$ 12,871	$ 7,064	$ 1,225	$ 672	$ 1,425	$ 782	$ -	$ -
	Jun-30	$ 15,489	$ 8,450	102	$ 12,839	$ 7,004	$ 1,225	$ 668	$ 1,425	$ 777	$ -	$ -
	Jul-30	$ 15,457	$ 8,383	103	$ 12,806	$ 6,945	$ 1,225	$ 665	$ 1,425	$ 773	$ -	$ -
	Aug-30	$ 15,424	$ 8,315	104	$ 12,774	$ 6,887	$ 1,225	$ 661	$ 1,425	$ 768	$ -	$ -
	Sep-30	$ 15,392	$ 8,249	105	$ 12,742	$ 6,828	$ 1,225	$ 657	$ 1,425	$ 764	$ -	$ -
	Oct-30	$ 15,360	$ 8,183	106	$ 12,709	$ 6,771	$ 1,225	$ 653	$ 1,425	$ 759	$ -	$ -
	Nov-30	$ 15,327	$ 8,117	107	$ 12,677	$ 6,714	$ 1,225	$ 649	$ 1,425	$ 755	$ -	$ -
	Dec-30	$ 15,295	$ 8,052	108	$ 12,644	$ 6,657	$ 1,225	$ 645	$ 1,425	$ 750	$ -	$ -
2031	Jan-31	$ 15,262	$ 7,987	109	$ 12,612	$ 6,600	$ 1,225	$ 641	$ 1,425	$ 746	$ -	$ -
	Feb-31	$ 15,230	$ 7,923	110	$ 12,580	$ 6,544	$ 1,225	$ 637	$ 1,425	$ 741	$ -	$ -
	Mar-31	$ 15,197	$ 7,859	111	$ 12,547	$ 6,489	$ 1,225	$ 634	$ 1,425	$ 737	$ -	$ -
	Apr-31	$ 15,165	$ 7,796	112	$ 12,515	$ 6,434	$ 1,225	$ 630	$ 1,425	$ 733	$ -	$ -
	May-31	$ 15,133	$ 7,734	113	$ 12,482	$ 6,379	$ 1,225	$ 626	$ 1,425	$ 728	$ -	$ -
	Jun-31	$ 15,100	$ 7,671	114	$ 12,450	$ 6,325	$ 1,225	$ 622	$ 1,425	$ 724	$ -	$ -
	Jul-31	$ 15,068	$ 7,609	115	$ 12,418	$ 6,271	$ 1,225	$ 619	$ 1,425	$ 720	$ -	$ -
	Aug-31	$ 15,035	$ 7,548	116	$ 12,385	$ 6,218	$ 1,225	$ 615	$ 1,425	$ 715	$ -	$ -
	Sep-31	$ 15,003	$ 7,487	117	$ 12,353	$ 6,165	$ 1,225	$ 611	$ 1,425	$ 711	$ -	$ -
	Oct-31	$ 14,971	$ 7,427	118	$ 12,320	$ 6,112	$ 1,225	$ 608	$ 1,425	$ 707	$ -	$ -
	Nov-31	$ 14,938	$ 7,367	119	$ 12,288	$ 6,060	$ 1,225	$ 604	$ 1,425	$ 703	$ -	$ -
	Dec-31	$ 14,906	$ 7,307	120	$ 12,256	$ 6,008	$ 1,225	$ 601	$ 1,425	$ 699	$ -	$ -
Total		$ 1,468,682	$ 1,468,682		$ 1,241,932	$ 1,241,932	$ 104,834	$ 104,834	$ 121,917	$ 121,917	$ -	$ -
		$ 19,681			$ 16,643		$ 1,405		$ 1,634		$ -	
		$ 236,175			$ 199,711		$ 16,858		$ 19,605		$ -	

THE POTOMAC EDISON COMPANY - MARYLAND
Little Orleans Avoided Distribution Revenue Requirement Calculation

Capital	$ 1,220,000	*(per Potomac Edison petition dated April 15, 2020 in Case No. 9619)*
Reg Depreciation	2.45%	*(estimated 40.8 year life of weighted average distribution, per Staff Exhibit 23 referenced in PSC Order No. 89072 issued March 22, 2019 in Case No. 9490)*
Tax Life	20	years *(IRS Pub. 946, Table B-2)*
Annual O&M	$ 12,200	*(per Potomac Edison petition dated April 15, 2020 in Case No. 9619)*
Annual PJM Value	$ -	*(N/A)*

Year	Month	Capital Placed In-Service	Total Capital In-Service Month Ending	Regulatory Book Depreciation	Regulatory Depreciation Reserve	Net Plant	ADIT	Rate Base	Capital Revenue Requirement	TOIT: *Property Tax*	O&M	PJM Value	Total Revenue Requirement
			-										
2022	Jan-22	$ 1,220,000	$ 1,220,000	$ 1,245	$ 1,245	$ 1,218,755	$ (706)	$ 1,218,048	$ 10,468	$ 874	$ 1,017	$ -	$ 12,359
	Feb-22	$ -	$ 1,220,000	$ 2,491	$ 3,736	$ 1,216,264	$ (1,070)	$ 1,215,194	$ 11,692	$ 874	$ 1,017	$ -	$ 13,583
	Mar-22	$ -	$ 1,220,000	$ 2,491	$ 6,227	$ 1,213,773	$ (1,434)	$ 1,212,339	$ 11,670	$ 874	$ 1,017	$ -	$ 13,561
	Apr-22	$ -	$ 1,220,000	$ 2,491	$ 8,718	$ 1,211,282	$ (1,797)	$ 1,209,485	$ 11,649	$ 874	$ 1,017	$ -	$ 13,540
	May-22	$ -	$ 1,220,000	$ 2,491	$ 11,209	$ 1,208,791	$ (2,161)	$ 1,206,630	$ 11,627	$ 874	$ 1,017	$ -	$ 13,518
	Jun-22	$ -	$ 1,220,000	$ 2,491	$ 13,700	$ 1,206,300	$ (2,525)	$ 1,203,776	$ 11,606	$ 874	$ 1,017	$ -	$ 13,496
	Jul-22	$ -	$ 1,220,000	$ 2,491	$ 16,190	$ 1,203,810	$ (2,889)	$ 1,200,921	$ 11,584	$ 874	$ 1,017	$ -	$ 13,475
	Aug-22	$ -	$ 1,220,000	$ 2,491	$ 18,681	$ 1,201,319	$ (3,252)	$ 1,198,067	$ 11,562	$ 874	$ 1,017	$ -	$ 13,453
	Sep-22	$ -	$ 1,220,000	$ 2,491	$ 21,172	$ 1,198,828	$ (3,616)	$ 1,195,212	$ 11,541	$ 874	$ 1,017	$ -	$ 13,432
	Oct-22	$ -	$ 1,220,000	$ 2,491	$ 23,663	$ 1,196,337	$ (3,980)	$ 1,192,357	$ 11,519	$ 874	$ 1,017	$ -	$ 13,410
	Nov-22	$ -	$ 1,220,000	$ 2,491	$ 26,154	$ 1,193,846	$ (4,343)	$ 1,189,503	$ 11,498	$ 874	$ 1,017	$ -	$ 13,388
	Dec-22	$ -	$ 1,220,000	$ 2,491	$ 28,645	$ 1,191,355	$ (4,707)	$ 1,186,648	$ 11,476	$ 874	$ 1,017	$ -	$ 13,367
2023	Jan-23	$ -	$ 1,220,000	$ 2,491	$ 31,135	$ 1,188,865	$ (6,041)	$ 1,182,823	$ 11,447	$ 874	$ 1,017	$ -	$ 13,338
	Feb-23	$ -	$ 1,220,000	$ 2,491	$ 33,626	$ 1,186,374	$ (7,375)	$ 1,178,998	$ 11,418	$ 874	$ 1,017	$ -	$ 13,309
	Mar-23	$ -	$ 1,220,000	$ 2,491	$ 36,117	$ 1,183,883	$ (8,710)	$ 1,175,173	$ 11,389	$ 874	$ 1,017	$ -	$ 13,280
	Apr-23	$ -	$ 1,220,000	$ 2,491	$ 38,608	$ 1,181,392	$ (10,044)	$ 1,171,348	$ 11,360	$ 874	$ 1,017	$ -	$ 13,251
	May-23	$ -	$ 1,220,000	$ 2,491	$ 41,099	$ 1,178,901	$ (11,378)	$ 1,167,523	$ 11,331	$ 874	$ 1,017	$ -	$ 13,222
	Jun-23	$ -	$ 1,220,000	$ 2,491	$ 43,590	$ 1,176,410	$ (12,712)	$ 1,163,698	$ 11,302	$ 874	$ 1,017	$ -	$ 13,193
	Jul-23	$ -	$ 1,220,000	$ 2,491	$ 46,080	$ 1,173,920	$ (14,046)	$ 1,159,873	$ 11,273	$ 874	$ 1,017	$ -	$ 13,164
	Aug-23	$ -	$ 1,220,000	$ 2,491	$ 48,571	$ 1,171,429	$ (15,380)	$ 1,156,048	$ 11,244	$ 874	$ 1,017	$ -	$ 13,135
	Sep-23	$ -	$ 1,220,000	$ 2,491	$ 51,062	$ 1,168,938	$ (16,715)	$ 1,152,223	$ 11,215	$ 874	$ 1,017	$ -	$ 13,106
	Oct-23	$ -	$ 1,220,000	$ 2,491	$ 53,553	$ 1,166,447	$ (18,049)	$ 1,148,398	$ 11,186	$ 874	$ 1,017	$ -	$ 13,077
	Nov-23	$ -	$ 1,220,000	$ 2,491	$ 56,044	$ 1,163,956	$ (19,383)	$ 1,144,573	$ 11,157	$ 874	$ 1,017	$ -	$ 13,048
	Dec-23	$ -	$ 1,220,000	$ 2,491	$ 58,535	$ 1,161,465	$ (20,717)	$ 1,140,748	$ 11,128	$ 874	$ 1,017	$ -	$ 13,019
2024	Jan-24	$ -	$ 1,220,000	$ 2,491	$ 61,025	$ 1,158,975	$ (21,900)	$ 1,137,075	$ 11,101	$ 874	$ 1,017	$ -	$ 12,991
	Feb-24	$ -	$ 1,220,000	$ 2,491	$ 63,516	$ 1,156,484	$ (23,082)	$ 1,133,401	$ 11,073	$ 874	$ 1,017	$ -	$ 12,964
	Mar-24	$ -	$ 1,220,000	$ 2,491	$ 66,007	$ 1,153,993	$ (24,265)	$ 1,129,728	$ 11,045	$ 874	$ 1,017	$ -	$ 12,936
	Apr-24	$ -	$ 1,220,000	$ 2,491	$ 68,498	$ 1,151,502	$ (25,447)	$ 1,126,055	$ 11,017	$ 874	$ 1,017	$ -	$ 12,908
	May-24	$ -	$ 1,220,000	$ 2,491	$ 70,989	$ 1,149,011	$ (26,630)	$ 1,122,381	$ 10,989	$ 874	$ 1,017	$ -	$ 12,880
	Jun-24	$ -	$ 1,220,000	$ 2,491	$ 73,480	$ 1,146,520	$ (27,812)	$ 1,118,708	$ 10,961	$ 874	$ 1,017	$ -	$ 12,852
	Jul-24	$ -	$ 1,220,000	$ 2,491	$ 75,970	$ 1,144,030	$ (28,995)	$ 1,115,035	$ 10,934	$ 874	$ 1,017	$ -	$ 12,825
	Aug-24	$ -	$ 1,220,000	$ 2,491	$ 78,461	$ 1,141,539	$ (30,178)	$ 1,111,361	$ 10,906	$ 874	$ 1,017	$ -	$ 12,797
	Sep-24	$ -	$ 1,220,000	$ 2,491	$ 80,952	$ 1,139,048	$ (31,360)	$ 1,107,688	$ 10,878	$ 874	$ 1,017	$ -	$ 12,769
	Oct-24	$ -	$ 1,220,000	$ 2,491	$ 83,443	$ 1,136,557	$ (32,543)	$ 1,104,014	$ 10,850	$ 874	$ 1,017	$ -	$ 12,741
	Nov-24	$ -	$ 1,220,000	$ 2,491	$ 85,934	$ 1,134,066	$ (33,725)	$ 1,100,341	$ 10,822	$ 874	$ 1,017	$ -	$ 12,713
	Dec-24	$ -	$ 1,220,000	$ 2,491	$ 88,425	$ 1,131,575	$ (34,908)	$ 1,096,668	$ 10,795	$ 874	$ 1,017	$ -	$ 12,685
2025	Jan-25	$ -	$ 1,220,000	$ 2,491	$ 90,915	$ 1,129,085	$ (35,950)	$ 1,093,134	$ 10,768	$ 874	$ 1,017	$ -	$ 12,659
	Feb-25	$ -	$ 1,220,000	$ 2,491	$ 93,406	$ 1,126,594	$ (36,993)	$ 1,089,601	$ 10,741	$ 874	$ 1,017	$ -	$ 12,632
	Mar-25	$ -	$ 1,220,000	$ 2,491	$ 95,897	$ 1,124,103	$ (38,036)	$ 1,086,067	$ 10,714	$ 874	$ 1,017	$ -	$ 12,605
	Apr-25	$ -	$ 1,220,000	$ 2,491	$ 98,388	$ 1,121,612	$ (39,078)	$ 1,082,534	$ 10,688	$ 874	$ 1,017	$ -	$ 12,578
	May-25	$ -	$ 1,220,000	$ 2,491	$ 100,879	$ 1,119,121	$ (40,121)	$ 1,079,000	$ 10,661	$ 874	$ 1,017	$ -	$ 12,552
	Jun-25	$ -	$ 1,220,000	$ 2,491	$ 103,370	$ 1,116,630	$ (41,164)	$ 1,075,467	$ 10,634	$ 874	$ 1,017	$ -	$ 12,525
	Jul-25	$ -	$ 1,220,000	$ 2,491	$ 105,860	$ 1,114,140	$ (42,206)	$ 1,071,933	$ 10,607	$ 874	$ 1,017	$ -	$ 12,498
	Aug-25	$ -	$ 1,220,000	$ 2,491	$ 108,351	$ 1,111,649	$ (43,249)	$ 1,068,400	$ 10,581	$ 874	$ 1,017	$ -	$ 12,471

THE POTOMAC EDISON COMPANY - MARYLAND
Little Orleans Avoided Distribution Revenue Requirement Calculation

Capital	$ 1,220,000	*(per Potomac Edison petition dated April 15, 2020 in Case No. 9619)*
Reg Depreciation	2.45%	*(estimated 40.8 year life of weighted average distribution, per Staff Exhibit 23 referenced in PSC Order No. 89072 issued March 22, 2019 in Case No. 9490)*
Tax Life	20	years *(IRS Pub. 946, Table B-2)*
Annual O&M	$ 12,200	*(per Potomac Edison petition dated April 15, 2020 in Case No. 9619)*
Annual PJM Value	$ -	*(N/A)*

Year	Month	Capital Placed In-Service	Total Capital In-Service Month Ending	Regulatory Book Depreciation	Regulatory Depreciation Reserve	Net Plant	ADIT	Rate Base	Capital Revenue Requirement	TOIT: *Property Tax*	O&M	PJM Value	Total Revenue Requirement
	Sep-25	$ -	$ 1,220,000	$ 2,491	$ 110,842	$ 1,109,158	$ (44,292)	$ 1,064,866	$ 10,554	$ 874	$ 1,017	$ -	$ 12,445
	Oct-25	$ -	$ 1,220,000	$ 2,491	$ 113,333	$ 1,106,667	$ (45,334)	$ 1,061,333	$ 10,527	$ 874	$ 1,017	$ -	$ 12,418
	Nov-25	$ -	$ 1,220,000	$ 2,491	$ 115,824	$ 1,104,176	$ (46,377)	$ 1,057,799	$ 10,500	$ 874	$ 1,017	$ -	$ 12,391
	Dec-25	$ -	$ 1,220,000	$ 2,491	$ 118,315	$ 1,101,685	$ (47,420)	$ 1,054,266	$ 10,474	$ 874	$ 1,017	$ -	$ 12,364
2026	Jan-26	$ -	$ 1,220,000	$ 2,491	$ 120,805	$ 1,099,195	$ (48,333)	$ 1,050,862	$ 10,448	$ 874	$ 1,017	$ -	$ 12,339
	Feb-26	$ -	$ 1,220,000	$ 2,491	$ 123,296	$ 1,096,704	$ (49,246)	$ 1,047,458	$ 10,422	$ 874	$ 1,017	$ -	$ 12,313
	Mar-26	$ -	$ 1,220,000	$ 2,491	$ 125,787	$ 1,094,213	$ (50,158)	$ 1,044,055	$ 10,396	$ 874	$ 1,017	$ -	$ 12,287
	Apr-26	$ -	$ 1,220,000	$ 2,491	$ 128,278	$ 1,091,722	$ (51,071)	$ 1,040,651	$ 10,370	$ 874	$ 1,017	$ -	$ 12,261
	May-26	$ -	$ 1,220,000	$ 2,491	$ 130,769	$ 1,089,231	$ (51,984)	$ 1,037,247	$ 10,345	$ 874	$ 1,017	$ -	$ 12,236
	Jun-26	$ -	$ 1,220,000	$ 2,491	$ 133,260	$ 1,086,740	$ (52,897)	$ 1,033,843	$ 10,319	$ 874	$ 1,017	$ -	$ 12,210
	Jul-26	$ -	$ 1,220,000	$ 2,491	$ 135,750	$ 1,084,250	$ (53,810)	$ 1,030,440	$ 10,293	$ 874	$ 1,017	$ -	$ 12,184
	Aug-26	$ -	$ 1,220,000	$ 2,491	$ 138,241	$ 1,081,759	$ (54,723)	$ 1,027,036	$ 10,267	$ 874	$ 1,017	$ -	$ 12,158
	Sep-26	$ -	$ 1,220,000	$ 2,491	$ 140,732	$ 1,079,268	$ (55,636)	$ 1,023,632	$ 10,242	$ 874	$ 1,017	$ -	$ 12,132
	Oct-26	$ -	$ 1,220,000	$ 2,491	$ 143,223	$ 1,076,777	$ (56,548)	$ 1,020,229	$ 10,216	$ 874	$ 1,017	$ -	$ 12,107
	Nov-26	$ -	$ 1,220,000	$ 2,491	$ 145,714	$ 1,074,286	$ (57,461)	$ 1,016,825	$ 10,190	$ 874	$ 1,017	$ -	$ 12,081
	Dec-26	$ -	$ 1,220,000	$ 2,491	$ 148,205	$ 1,071,795	$ (58,374)	$ 1,013,421	$ 10,164	$ 874	$ 1,017	$ -	$ 12,055
2027	Jan-27	$ -	$ 1,220,000	$ 2,491	$ 150,695	$ 1,069,305	$ (59,167)	$ 1,010,137	$ 10,139	$ 874	$ 1,017	$ -	$ 12,030
	Feb-27	$ -	$ 1,220,000	$ 2,491	$ 153,186	$ 1,066,814	$ (59,960)	$ 1,006,853	$ 10,115	$ 874	$ 1,017	$ -	$ 12,005
	Mar-27	$ -	$ 1,220,000	$ 2,491	$ 155,677	$ 1,064,323	$ (60,754)	$ 1,003,569	$ 10,090	$ 874	$ 1,017	$ -	$ 11,981
	Apr-27	$ -	$ 1,220,000	$ 2,491	$ 158,168	$ 1,061,832	$ (61,547)	$ 1,000,285	$ 10,065	$ 874	$ 1,017	$ -	$ 11,956
	May-27	$ -	$ 1,220,000	$ 2,491	$ 160,659	$ 1,059,341	$ (62,340)	$ 997,001	$ 10,040	$ 874	$ 1,017	$ -	$ 11,931
	Jun-27	$ -	$ 1,220,000	$ 2,491	$ 163,150	$ 1,056,850	$ (63,133)	$ 993,718	$ 10,015	$ 874	$ 1,017	$ -	$ 11,906
	Jul-27	$ -	$ 1,220,000	$ 2,491	$ 165,640	$ 1,054,360	$ (63,926)	$ 990,434	$ 9,990	$ 874	$ 1,017	$ -	$ 11,881
	Aug-27	$ -	$ 1,220,000	$ 2,491	$ 168,131	$ 1,051,869	$ (64,719)	$ 987,150	$ 9,965	$ 874	$ 1,017	$ -	$ 11,856
	Sep-27	$ -	$ 1,220,000	$ 2,491	$ 170,622	$ 1,049,378	$ (65,512)	$ 983,866	$ 9,940	$ 874	$ 1,017	$ -	$ 11,831
	Oct-27	$ -	$ 1,220,000	$ 2,491	$ 173,113	$ 1,046,887	$ (66,305)	$ 980,582	$ 9,916	$ 874	$ 1,017	$ -	$ 11,806
	Nov-27	$ -	$ 1,220,000	$ 2,491	$ 175,604	$ 1,044,396	$ (67,098)	$ 977,298	$ 9,891	$ 874	$ 1,017	$ -	$ 11,782
	Dec-27	$ -	$ 1,220,000	$ 2,491	$ 178,095	$ 1,041,905	$ (67,892)	$ 974,014	$ 9,866	$ 874	$ 1,017	$ -	$ 11,757
2028	Jan-28	$ -	$ 1,220,000	$ 2,491	$ 180,585	$ 1,039,415	$ (68,574)	$ 970,841	$ 9,842	$ 874	$ 1,017	$ -	$ 11,733
	Feb-28	$ -	$ 1,220,000	$ 2,491	$ 183,076	$ 1,036,924	$ (69,256)	$ 967,668	$ 9,818	$ 874	$ 1,017	$ -	$ 11,709
	Mar-28	$ -	$ 1,220,000	$ 2,491	$ 185,567	$ 1,034,433	$ (69,938)	$ 964,495	$ 9,794	$ 874	$ 1,017	$ -	$ 11,685
	Apr-28	$ -	$ 1,220,000	$ 2,491	$ 188,058	$ 1,031,942	$ (70,620)	$ 961,322	$ 9,770	$ 874	$ 1,017	$ -	$ 11,661
	May-28	$ -	$ 1,220,000	$ 2,491	$ 190,549	$ 1,029,451	$ (71,302)	$ 958,149	$ 9,746	$ 874	$ 1,017	$ -	$ 11,637
	Jun-28	$ -	$ 1,220,000	$ 2,491	$ 193,040	$ 1,026,960	$ (71,984)	$ 954,976	$ 9,722	$ 874	$ 1,017	$ -	$ 11,613
	Jul-28	$ -	$ 1,220,000	$ 2,491	$ 195,530	$ 1,024,470	$ (72,666)	$ 951,804	$ 9,698	$ 874	$ 1,017	$ -	$ 11,589
	Aug-28	$ -	$ 1,220,000	$ 2,491	$ 198,021	$ 1,021,979	$ (73,348)	$ 948,631	$ 9,674	$ 874	$ 1,017	$ -	$ 11,565
	Sep-28	$ -	$ 1,220,000	$ 2,491	$ 200,512	$ 1,019,488	$ (74,030)	$ 945,458	$ 9,650	$ 874	$ 1,017	$ -	$ 11,541
	Oct-28	$ -	$ 1,220,000	$ 2,491	$ 203,003	$ 1,016,997	$ (74,712)	$ 942,285	$ 9,626	$ 874	$ 1,017	$ -	$ 11,517
	Nov-28	$ -	$ 1,220,000	$ 2,491	$ 205,494	$ 1,014,506	$ (75,394)	$ 939,112	$ 9,602	$ 874	$ 1,017	$ -	$ 11,492
	Dec-28	$ -	$ 1,220,000	$ 2,491	$ 207,985	$ 1,012,015	$ (76,076)	$ 935,939	$ 9,578	$ 874	$ 1,017	$ -	$ 11,468
2029	Jan-29	$ -	$ 1,220,000	$ 2,491	$ 210,475	$ 1,009,525	$ (76,656)	$ 932,869	$ 9,554	$ 874	$ 1,017	$ -	$ 11,445
	Feb-29	$ -	$ 1,220,000	$ 2,491	$ 212,966	$ 1,007,034	$ (77,236)	$ 929,798	$ 9,531	$ 874	$ 1,017	$ -	$ 11,422
	Mar-29	$ -	$ 1,220,000	$ 2,491	$ 215,457	$ 1,004,543	$ (77,815)	$ 926,728	$ 9,508	$ 874	$ 1,017	$ -	$ 11,399
	Apr-29	$ -	$ 1,220,000	$ 2,491	$ 217,948	$ 1,002,052	$ (78,395)	$ 923,657	$ 9,485	$ 874	$ 1,017	$ -	$ 11,375
	May-29	$ -	$ 1,220,000	$ 2,491	$ 220,439	$ 999,561	$ (78,975)	$ 920,587	$ 9,461	$ 874	$ 1,017	$ -	$ 11,352

THE POTOMAC EDISON COMPANY - MARYLAND
Little Orleans Avoided Distribution Revenue Requirement Calculation

Capital	$ 1,220,000	*(per Potomac Edison petition dated April 15, 2020 in Case No. 9619)*
Reg Depreciation	2.45%	*(estimated 40.8 year life of weighted average distribution, per Staff Exhibit 23 referenced in PSC Order No. 89072 issued March 22, 2019 in Case No. 9490)*
Tax Life	20	years *(IRS Pub. 946, Table B-2)*
Annual O&M	$ 12,200	*(per Potomac Edison petition dated April 15, 2020 in Case No. 9619)*
Annual PJM Value	$ -	*(N/A)*

Year	Month	Capital Placed In-Service	Total Capital In-Service Month Ending	Regulatory Book Depreciation	Regulatory Depreciation Reserve	Net Plant	ADIT	Rate Base	Capital Revenue Requirement	TOIT: *Property Tax*	O&M	PJM Value	Total Revenue Requirement
	Jun-29	$ -	$ 1,220,000	$ 2,491	$ 222,930	$ 997,070	$ (79,554)	$ 917,516	$ 9,438	$ 874	$ 1,017	$ -	$ 11,329
	Jul-29	$ -	$ 1,220,000	$ 2,491	$ 225,420	$ 994,580	$ (80,134)	$ 914,446	$ 9,415	$ 874	$ 1,017	$ -	$ 11,306
	Aug-29	$ -	$ 1,220,000	$ 2,491	$ 227,911	$ 992,089	$ (80,714)	$ 911,375	$ 9,392	$ 874	$ 1,017	$ -	$ 11,282
	Sep-29	$ -	$ 1,220,000	$ 2,491	$ 230,402	$ 989,598	$ (81,293)	$ 908,305	$ 9,368	$ 874	$ 1,017	$ -	$ 11,259
	Oct-29	$ -	$ 1,220,000	$ 2,491	$ 232,893	$ 987,107	$ (81,873)	$ 905,234	$ 9,345	$ 874	$ 1,017	$ -	$ 11,236
	Nov-29	$ -	$ 1,220,000	$ 2,491	$ 235,384	$ 984,616	$ (82,453)	$ 902,164	$ 9,322	$ 874	$ 1,017	$ -	$ 11,213
	Dec-29	$ -	$ 1,220,000	$ 2,491	$ 237,875	$ 982,125	$ (83,032)	$ 899,093	$ 9,299	$ 874	$ 1,017	$ -	$ 11,189
2030	Jan-30	$ -	$ 1,220,000	$ 2,491	$ 240,365	$ 979,635	$ (83,595)	$ 896,039	$ 9,275	$ 874	$ 1,017	$ -	$ 11,166
	Feb-30	$ -	$ 1,220,000	$ 2,491	$ 242,856	$ 977,144	$ (84,158)	$ 892,986	$ 9,252	$ 874	$ 1,017	$ -	$ 11,143
	Mar-30	$ -	$ 1,220,000	$ 2,491	$ 245,347	$ 974,653	$ (84,721)	$ 889,932	$ 9,229	$ 874	$ 1,017	$ -	$ 11,120
	Apr-30	$ -	$ 1,220,000	$ 2,491	$ 247,838	$ 972,162	$ (85,284)	$ 886,878	$ 9,206	$ 874	$ 1,017	$ -	$ 11,097
	May-30	$ -	$ 1,220,000	$ 2,491	$ 250,329	$ 969,671	$ (85,847)	$ 883,825	$ 9,183	$ 874	$ 1,017	$ -	$ 11,074
	Jun-30	$ -	$ 1,220,000	$ 2,491	$ 252,820	$ 967,180	$ (86,410)	$ 880,771	$ 9,160	$ 874	$ 1,017	$ -	$ 11,051
	Jul-30	$ -	$ 1,220,000	$ 2,491	$ 255,310	$ 964,690	$ (86,972)	$ 877,717	$ 9,137	$ 874	$ 1,017	$ -	$ 11,028
	Aug-30	$ -	$ 1,220,000	$ 2,491	$ 257,801	$ 962,199	$ (87,535)	$ 874,663	$ 9,114	$ 874	$ 1,017	$ -	$ 11,005
	Sep-30	$ -	$ 1,220,000	$ 2,491	$ 260,292	$ 959,708	$ (88,098)	$ 871,610	$ 9,091	$ 874	$ 1,017	$ -	$ 10,981
	Oct-30	$ -	$ 1,220,000	$ 2,491	$ 262,783	$ 957,217	$ (88,661)	$ 868,556	$ 9,067	$ 874	$ 1,017	$ -	$ 10,958
	Nov-30	$ -	$ 1,220,000	$ 2,491	$ 265,274	$ 954,726	$ (89,224)	$ 865,502	$ 9,044	$ 874	$ 1,017	$ -	$ 10,935
	Dec-30	$ -	$ 1,220,000	$ 2,491	$ 267,765	$ 952,235	$ (89,787)	$ 862,449	$ 9,021	$ 874	$ 1,017	$ -	$ 10,912
2031	Jan-31	$ -	$ 1,220,000	$ 2,491	$ 270,255	$ 949,745	$ (90,349)	$ 859,395	$ 8,998	$ 874	$ 1,017	$ -	$ 10,889
	Feb-31	$ -	$ 1,220,000	$ 2,491	$ 272,746	$ 947,254	$ (90,912)	$ 856,342	$ 8,975	$ 874	$ 1,017	$ -	$ 10,866
	Mar-31	$ -	$ 1,220,000	$ 2,491	$ 275,237	$ 944,763	$ (91,475)	$ 853,288	$ 8,952	$ 874	$ 1,017	$ -	$ 10,843
	Apr-31	$ -	$ 1,220,000	$ 2,491	$ 277,728	$ 942,272	$ (92,037)	$ 850,235	$ 8,929	$ 874	$ 1,017	$ -	$ 10,820
	May-31	$ -	$ 1,220,000	$ 2,491	$ 280,219	$ 939,781	$ (92,600)	$ 847,181	$ 8,906	$ 874	$ 1,017	$ -	$ 10,796
	Jun-31	$ -	$ 1,220,000	$ 2,491	$ 282,710	$ 937,290	$ (93,162)	$ 844,128	$ 8,882	$ 874	$ 1,017	$ -	$ 10,773
	Jul-31	$ -	$ 1,220,000	$ 2,491	$ 285,200	$ 934,800	$ (93,725)	$ 841,074	$ 8,859	$ 874	$ 1,017	$ -	$ 10,750
	Aug-31	$ -	$ 1,220,000	$ 2,491	$ 287,691	$ 932,309	$ (94,288)	$ 838,021	$ 8,836	$ 874	$ 1,017	$ -	$ 10,727
	Sep-31	$ -	$ 1,220,000	$ 2,491	$ 290,182	$ 929,818	$ (94,850)	$ 834,968	$ 8,813	$ 874	$ 1,017	$ -	$ 10,704
	Oct-31	$ -	$ 1,220,000	$ 2,491	$ 292,673	$ 927,327	$ (95,413)	$ 831,914	$ 8,790	$ 874	$ 1,017	$ -	$ 10,681
	Nov-31	$ -	$ 1,220,000	$ 2,491	$ 295,164	$ 924,836	$ (95,975)	$ 828,861	$ 8,767	$ 874	$ 1,017	$ -	$ 10,658
	Dec-31	$ -	$ 1,220,000	$ 2,491	$ 297,655	$ 922,345	$ (96,538)	$ 825,807	$ 8,744	$ 874	$ 1,017	$ -	$ 10,635

Total $ 1,220,000

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THE POTOMAC EDISON C
Little Orleans Avoided Dis

Capital
Reg Depreciation
Tax Life
Annual O&M
Annual PJM Value

Year	Month	Total Before Present Value	Present Value	# of Periods	Total Before Present Value: *Allocated Capital*	Present Value: *Allocated Capital*	Total Before Present Value: *Allocated Property Tax*	Present Value: *Allocated Property Tax*	Total Before Present Value: *Allocated O&M*	Present Value: *Allocated O&M*	Total Before Present Value: *PJM Value*	Present Value: *PJM Value*
2022	Jan-22	$ 12,359	$ 12,286	1	$ 10,468	$ 10,406	$ 874	$ 869	$ 1,017	$ 1,011	$ -	$ -
	Feb-22	$ 13,583	$ 13,423	2	$ 11,692	$ 11,554	$ 874	$ 864	$ 1,017	$ 1,005	$ -	$ -
	Mar-22	$ 13,561	$ 13,322	3	$ 11,670	$ 11,464	$ 874	$ 859	$ 1,017	$ 999	$ -	$ -
	Apr-22	$ 13,540	$ 13,222	4	$ 11,649	$ 11,375	$ 874	$ 854	$ 1,017	$ 993	$ -	$ -
	May-22	$ 13,518	$ 13,122	5	$ 11,627	$ 11,287	$ 874	$ 849	$ 1,017	$ 987	$ -	$ -
	Jun-22	$ 13,496	$ 13,024	6	$ 11,606	$ 11,199	$ 874	$ 844	$ 1,017	$ 981	$ -	$ -
	Jul-22	$ 13,475	$ 12,926	7	$ 11,584	$ 11,112	$ 874	$ 839	$ 1,017	$ 975	$ -	$ -
	Aug-22	$ 13,453	$ 12,829	8	$ 11,562	$ 11,026	$ 874	$ 834	$ 1,017	$ 969	$ -	$ -
	Sep-22	$ 13,432	$ 12,732	9	$ 11,541	$ 10,940	$ 874	$ 829	$ 1,017	$ 964	$ -	$ -
	Oct-22	$ 13,410	$ 12,637	10	$ 11,519	$ 10,855	$ 874	$ 824	$ 1,017	$ 958	$ -	$ -
	Nov-22	$ 13,388	$ 12,541	11	$ 11,498	$ 10,770	$ 874	$ 819	$ 1,017	$ 952	$ -	$ -
	Dec-22	$ 13,367	$ 12,447	12	$ 11,476	$ 10,686	$ 874	$ 814	$ 1,017	$ 947	$ -	$ -
2023	Jan-23	$ 13,338	$ 12,347	13	$ 11,447	$ 10,596	$ 874	$ 809	$ 1,017	$ 941	$ -	$ -
	Feb-23	$ 13,309	$ 12,247	14	$ 11,418	$ 10,507	$ 874	$ 804	$ 1,017	$ 936	$ -	$ -
	Mar-23	$ 13,280	$ 12,148	15	$ 11,389	$ 10,418	$ 874	$ 800	$ 1,017	$ 930	$ -	$ -
	Apr-23	$ 13,251	$ 12,049	16	$ 11,360	$ 10,330	$ 874	$ 795	$ 1,017	$ 924	$ -	$ -
	May-23	$ 13,222	$ 11,952	17	$ 11,331	$ 10,243	$ 874	$ 790	$ 1,017	$ 919	$ -	$ -
	Jun-23	$ 13,193	$ 11,855	18	$ 11,302	$ 10,156	$ 874	$ 786	$ 1,017	$ 914	$ -	$ -
	Jul-23	$ 13,164	$ 11,759	19	$ 11,273	$ 10,070	$ 874	$ 781	$ 1,017	$ 908	$ -	$ -
	Aug-23	$ 13,135	$ 11,664	20	$ 11,244	$ 9,985	$ 874	$ 776	$ 1,017	$ 903	$ -	$ -
	Sep-23	$ 13,106	$ 11,569	21	$ 11,215	$ 9,900	$ 874	$ 772	$ 1,017	$ 897	$ -	$ -
	Oct-23	$ 13,077	$ 11,475	22	$ 11,186	$ 9,816	$ 874	$ 767	$ 1,017	$ 892	$ -	$ -
	Nov-23	$ 13,048	$ 11,382	23	$ 11,157	$ 9,732	$ 874	$ 763	$ 1,017	$ 887	$ -	$ -
	Dec-23	$ 13,019	$ 11,289	24	$ 11,128	$ 9,650	$ 874	$ 758	$ 1,017	$ 882	$ -	$ -
2024	Jan-24	$ 12,991	$ 11,198	25	$ 11,101	$ 9,569	$ 874	$ 754	$ 1,017	$ 876	$ -	$ -
	Feb-24	$ 12,964	$ 11,108	26	$ 11,073	$ 9,488	$ 874	$ 749	$ 1,017	$ 871	$ -	$ -
	Mar-24	$ 12,936	$ 11,019	27	$ 11,045	$ 9,408	$ 874	$ 745	$ 1,017	$ 866	$ -	$ -
	Apr-24	$ 12,908	$ 10,930	28	$ 11,017	$ 9,329	$ 874	$ 740	$ 1,017	$ 861	$ -	$ -
	May-24	$ 12,880	$ 10,842	29	$ 10,989	$ 9,250	$ 874	$ 736	$ 1,017	$ 856	$ -	$ -
	Jun-24	$ 12,852	$ 10,754	30	$ 10,961	$ 9,172	$ 874	$ 732	$ 1,017	$ 851	$ -	$ -
	Jul-24	$ 12,825	$ 10,667	31	$ 10,934	$ 9,095	$ 874	$ 727	$ 1,017	$ 846	$ -	$ -
	Aug-24	$ 12,797	$ 10,581	32	$ 10,906	$ 9,018	$ 874	$ 723	$ 1,017	$ 841	$ -	$ -
	Sep-24	$ 12,769	$ 10,496	33	$ 10,878	$ 8,942	$ 874	$ 719	$ 1,017	$ 836	$ -	$ -
	Oct-24	$ 12,741	$ 10,411	34	$ 10,850	$ 8,866	$ 874	$ 714	$ 1,017	$ 831	$ -	$ -
	Nov-24	$ 12,713	$ 10,327	35	$ 10,822	$ 8,791	$ 874	$ 710	$ 1,017	$ 826	$ -	$ -
	Dec-24	$ 12,685	$ 10,243	36	$ 10,795	$ 8,716	$ 874	$ 706	$ 1,017	$ 821	$ -	$ -
2025	Jan-25	$ 12,659	$ 10,161	37	$ 10,768	$ 8,643	$ 874	$ 702	$ 1,017	$ 816	$ -	$ -
	Feb-25	$ 12,632	$ 10,079	38	$ 10,741	$ 8,571	$ 874	$ 698	$ 1,017	$ 811	$ -	$ -
	Mar-25	$ 12,605	$ 9,998	39	$ 10,714	$ 8,499	$ 874	$ 693	$ 1,017	$ 806	$ -	$ -
	Apr-25	$ 12,578	$ 9,918	40	$ 10,688	$ 8,427	$ 874	$ 689	$ 1,017	$ 802	$ -	$ -
	May-25	$ 12,552	$ 9,838	41	$ 10,661	$ 8,356	$ 874	$ 685	$ 1,017	$ 797	$ -	$ -
	Jun-25	$ 12,525	$ 9,759	42	$ 10,634	$ 8,286	$ 874	$ 681	$ 1,017	$ 792	$ -	$ -
	Jul-25	$ 12,498	$ 9,681	43	$ 10,607	$ 8,216	$ 874	$ 677	$ 1,017	$ 787	$ -	$ -
	Aug-25	$ 12,471	$ 9,603	44	$ 10,581	$ 8,147	$ 874	$ 673	$ 1,017	$ 783	$ -	$ -

THE POTOMAC EDISON C
Little Orleans Avoided Dis

Capital
Reg Depreciation
Tax Life
Annual O&M
Annual PJM Value

Year	Month	Total Before Present Value	Present Value	# of Periods	Total Before Present Value: *Allocated Capital*	Present Value: *Allocated Capital*	Total Before Present Value: *Allocated Property Tax*	Present Value: *Allocated Property Tax*	Total Before Present Value: *Allocated O&M*	Present Value: *Allocated O&M*	Total Before Present Value: *PJM Value*	Present Value: *PJM Value*
	Sep-25	$ 12,445	$ 9,525	45	$ 10,554	$ 8,078	$ 874	$ 669	$ 1,017	$ 778	$ -	$ -
	Oct-25	$ 12,418	$ 9,449	46	$ 10,527	$ 8,010	$ 874	$ 665	$ 1,017	$ 774	$ -	$ -
	Nov-25	$ 12,391	$ 9,372	47	$ 10,500	$ 7,942	$ 874	$ 661	$ 1,017	$ 769	$ -	$ -
	Dec-25	$ 12,364	$ 9,297	48	$ 10,474	$ 7,875	$ 874	$ 657	$ 1,017	$ 764	$ -	$ -
2026	Jan-26	$ 12,339	$ 9,222	49	$ 10,448	$ 7,809	$ 874	$ 653	$ 1,017	$ 760	$ -	$ -
	Feb-26	$ 12,313	$ 9,149	50	$ 10,422	$ 7,744	$ 874	$ 650	$ 1,017	$ 755	$ -	$ -
	Mar-26	$ 12,287	$ 9,075	51	$ 10,396	$ 7,679	$ 874	$ 646	$ 1,017	$ 751	$ -	$ -
	Apr-26	$ 12,261	$ 9,003	52	$ 10,370	$ 7,614	$ 874	$ 642	$ 1,017	$ 746	$ -	$ -
	May-26	$ 12,236	$ 8,931	53	$ 10,345	$ 7,551	$ 874	$ 638	$ 1,017	$ 742	$ -	$ -
	Jun-26	$ 12,210	$ 8,859	54	$ 10,319	$ 7,487	$ 874	$ 634	$ 1,017	$ 738	$ -	$ -
	Jul-26	$ 12,184	$ 8,788	55	$ 10,293	$ 7,424	$ 874	$ 631	$ 1,017	$ 733	$ -	$ -
	Aug-26	$ 12,158	$ 8,717	56	$ 10,267	$ 7,362	$ 874	$ 627	$ 1,017	$ 729	$ -	$ -
	Sep-26	$ 12,132	$ 8,647	57	$ 10,242	$ 7,300	$ 874	$ 623	$ 1,017	$ 725	$ -	$ -
	Oct-26	$ 12,107	$ 8,578	58	$ 10,216	$ 7,238	$ 874	$ 619	$ 1,017	$ 720	$ -	$ -
	Nov-26	$ 12,081	$ 8,509	59	$ 10,190	$ 7,177	$ 874	$ 616	$ 1,017	$ 716	$ -	$ -
	Dec-26	$ 12,055	$ 8,441	60	$ 10,164	$ 7,117	$ 874	$ 612	$ 1,017	$ 712	$ -	$ -
2027	Jan-27	$ 12,030	$ 8,373	61	$ 10,139	$ 7,057	$ 874	$ 608	$ 1,017	$ 708	$ -	$ -
	Feb-27	$ 12,005	$ 8,306	62	$ 10,115	$ 6,998	$ 874	$ 605	$ 1,017	$ 703	$ -	$ -
	Mar-27	$ 11,981	$ 8,240	63	$ 10,090	$ 6,940	$ 874	$ 601	$ 1,017	$ 699	$ -	$ -
	Apr-27	$ 11,956	$ 8,174	64	$ 10,065	$ 6,882	$ 874	$ 598	$ 1,017	$ 695	$ -	$ -
	May-27	$ 11,931	$ 8,109	65	$ 10,040	$ 6,824	$ 874	$ 594	$ 1,017	$ 691	$ -	$ -
	Jun-27	$ 11,906	$ 8,044	66	$ 10,015	$ 6,767	$ 874	$ 591	$ 1,017	$ 687	$ -	$ -
	Jul-27	$ 11,881	$ 7,980	67	$ 9,990	$ 6,710	$ 874	$ 587	$ 1,017	$ 683	$ -	$ -
	Aug-27	$ 11,856	$ 7,916	68	$ 9,965	$ 6,654	$ 874	$ 584	$ 1,017	$ 679	$ -	$ -
	Sep-27	$ 11,831	$ 7,853	69	$ 9,940	$ 6,598	$ 874	$ 580	$ 1,017	$ 675	$ -	$ -
	Oct-27	$ 11,806	$ 7,790	70	$ 9,916	$ 6,542	$ 874	$ 577	$ 1,017	$ 671	$ -	$ -
	Nov-27	$ 11,782	$ 7,727	71	$ 9,891	$ 6,487	$ 874	$ 573	$ 1,017	$ 667	$ -	$ -
	Dec-27	$ 11,757	$ 7,665	72	$ 9,866	$ 6,432	$ 874	$ 570	$ 1,017	$ 663	$ -	$ -
2028	Jan-28	$ 11,733	$ 7,604	73	$ 9,842	$ 6,379	$ 874	$ 567	$ 1,017	$ 659	$ -	$ -
	Feb-28	$ 11,709	$ 7,544	74	$ 9,818	$ 6,326	$ 874	$ 563	$ 1,017	$ 655	$ -	$ -
	Mar-28	$ 11,685	$ 7,484	75	$ 9,794	$ 6,273	$ 874	$ 560	$ 1,017	$ 651	$ -	$ -
	Apr-28	$ 11,661	$ 7,424	76	$ 9,770	$ 6,220	$ 874	$ 557	$ 1,017	$ 647	$ -	$ -
	May-28	$ 11,637	$ 7,365	77	$ 9,746	$ 6,168	$ 874	$ 553	$ 1,017	$ 643	$ -	$ -
	Jun-28	$ 11,613	$ 7,306	78	$ 9,722	$ 6,117	$ 874	$ 550	$ 1,017	$ 640	$ -	$ -
	Jul-28	$ 11,589	$ 7,248	79	$ 9,698	$ 6,065	$ 874	$ 547	$ 1,017	$ 636	$ -	$ -
	Aug-28	$ 11,565	$ 7,190	80	$ 9,674	$ 6,014	$ 874	$ 544	$ 1,017	$ 632	$ -	$ -
	Sep-28	$ 11,541	$ 7,133	81	$ 9,650	$ 5,964	$ 874	$ 540	$ 1,017	$ 628	$ -	$ -
	Oct-28	$ 11,517	$ 7,076	82	$ 9,626	$ 5,914	$ 874	$ 537	$ 1,017	$ 625	$ -	$ -
	Nov-28	$ 11,492	$ 7,019	83	$ 9,602	$ 5,864	$ 874	$ 534	$ 1,017	$ 621	$ -	$ -
	Dec-28	$ 11,468	$ 6,963	84	$ 9,578	$ 5,815	$ 874	$ 531	$ 1,017	$ 617	$ -	$ -
2029	Jan-29	$ 11,445	$ 6,908	85	$ 9,554	$ 5,766	$ 874	$ 528	$ 1,017	$ 614	$ -	$ -
	Feb-29	$ 11,422	$ 6,853	86	$ 9,531	$ 5,718	$ 874	$ 524	$ 1,017	$ 610	$ -	$ -
	Mar-29	$ 11,399	$ 6,798	87	$ 9,508	$ 5,671	$ 874	$ 521	$ 1,017	$ 606	$ -	$ -
	Apr-29	$ 11,375	$ 6,744	88	$ 9,485	$ 5,623	$ 874	$ 518	$ 1,017	$ 603	$ -	$ -
	May-29	$ 11,352	$ 6,691	89	$ 9,461	$ 5,576	$ 874	$ 515	$ 1,017	$ 599	$ -	$ -

THE POTOMAC EDISON C
Little Orleans Avoided Dis

Capital
Reg Depreciation
Tax Life
Annual O&M
Annual PJM Value

Year	Month	Total Before Present Value	Present Value	# of Periods	Total Before Present Value: *Allocated Capital*	Present Value: *Allocated Capital*	Total Before Present Value: *Allocated Property Tax*	Present Value: *Allocated Property Tax*	Total Before Present Value: *Allocated O&M*	Present Value: *Allocated O&M*	Total Before Present Value: *PJM Value*	Present Value: *PJM Value*
	Jun-29	$ 11,329	$ 6,637	90	$ 9,438	$ 5,529	$ 874	$ 512	$ 1,017	$ 596	$ -	$ -
	Jul-29	$ 11,306	$ 6,584	91	$ 9,415	$ 5,483	$ 874	$ 509	$ 1,017	$ 592	$ -	$ -
	Aug-29	$ 11,282	$ 6,532	92	$ 9,392	$ 5,437	$ 874	$ 506	$ 1,017	$ 589	$ -	$ -
	Sep-29	$ 11,259	$ 6,480	93	$ 9,368	$ 5,392	$ 874	$ 503	$ 1,017	$ 585	$ -	$ -
	Oct-29	$ 11,236	$ 6,428	94	$ 9,345	$ 5,346	$ 874	$ 500	$ 1,017	$ 582	$ -	$ -
	Nov-29	$ 11,213	$ 6,377	95	$ 9,322	$ 5,302	$ 874	$ 497	$ 1,017	$ 578	$ -	$ -
	Dec-29	$ 11,189	$ 6,326	96	$ 9,299	$ 5,257	$ 874	$ 494	$ 1,017	$ 575	$ -	$ -
2030	Jan-30	$ 11,166	$ 6,276	97	$ 9,275	$ 5,213	$ 874	$ 491	$ 1,017	$ 571	$ -	$ -
	Feb-30	$ 11,143	$ 6,225	98	$ 9,252	$ 5,169	$ 874	$ 488	$ 1,017	$ 568	$ -	$ -
	Mar-30	$ 11,120	$ 6,176	99	$ 9,229	$ 5,126	$ 874	$ 486	$ 1,017	$ 565	$ -	$ -
	Apr-30	$ 11,097	$ 6,126	100	$ 9,206	$ 5,082	$ 874	$ 483	$ 1,017	$ 561	$ -	$ -
	May-30	$ 11,074	$ 6,077	101	$ 9,183	$ 5,040	$ 874	$ 480	$ 1,017	$ 558	$ -	$ -
	Jun-30	$ 11,051	$ 6,029	102	$ 9,160	$ 4,997	$ 874	$ 477	$ 1,017	$ 555	$ -	$ -
	Jul-30	$ 11,028	$ 5,981	103	$ 9,137	$ 4,955	$ 874	$ 474	$ 1,017	$ 551	$ -	$ -
	Aug-30	$ 11,005	$ 5,933	104	$ 9,114	$ 4,913	$ 874	$ 471	$ 1,017	$ 548	$ -	$ -
	Sep-30	$ 10,981	$ 5,885	105	$ 9,091	$ 4,872	$ 874	$ 469	$ 1,017	$ 545	$ -	$ -
	Oct-30	$ 10,958	$ 5,838	106	$ 9,067	$ 4,831	$ 874	$ 466	$ 1,017	$ 542	$ -	$ -
	Nov-30	$ 10,935	$ 5,791	107	$ 9,044	$ 4,790	$ 874	$ 463	$ 1,017	$ 538	$ -	$ -
	Dec-30	$ 10,912	$ 5,745	108	$ 9,021	$ 4,749	$ 874	$ 460	$ 1,017	$ 535	$ -	$ -
2031	Jan-31	$ 10,889	$ 5,699	109	$ 8,998	$ 4,709	$ 874	$ 458	$ 1,017	$ 532	$ -	$ -
	Feb-31	$ 10,866	$ 5,653	110	$ 8,975	$ 4,669	$ 874	$ 455	$ 1,017	$ 529	$ -	$ -
	Mar-31	$ 10,843	$ 5,607	111	$ 8,952	$ 4,629	$ 874	$ 452	$ 1,017	$ 526	$ -	$ -
	Apr-31	$ 10,820	$ 5,562	112	$ 8,929	$ 4,590	$ 874	$ 449	$ 1,017	$ 523	$ -	$ -
	May-31	$ 10,796	$ 5,517	113	$ 8,906	$ 4,551	$ 874	$ 447	$ 1,017	$ 520	$ -	$ -
	Jun-31	$ 10,773	$ 5,473	114	$ 8,882	$ 4,512	$ 874	$ 444	$ 1,017	$ 516	$ -	$ -
	Jul-31	$ 10,750	$ 5,429	115	$ 8,859	$ 4,474	$ 874	$ 441	$ 1,017	$ 513	$ -	$ -
	Aug-31	$ 10,727	$ 5,385	116	$ 8,836	$ 4,436	$ 874	$ 439	$ 1,017	$ 510	$ -	$ -
	Sep-31	$ 10,704	$ 5,342	117	$ 8,813	$ 4,398	$ 874	$ 436	$ 1,017	$ 507	$ -	$ -
	Oct-31	$ 10,681	$ 5,299	118	$ 8,790	$ 4,361	$ 874	$ 434	$ 1,017	$ 504	$ -	$ -
	Nov-31	$ 10,658	$ 5,256	119	$ 8,767	$ 4,323	$ 874	$ 431	$ 1,017	$ 501	$ -	$ -
	Dec-31	$ 10,635	$ 5,213	120	$ 8,744	$ 4,286	$ 874	$ 429	$ 1,017	$ 498	$ -	$ -
Total		$ 1,047,832	$ 1,047,832		$ 886,057	$ 886,057	$ 74,794	$ 74,794	$ 86,982	$ 86,982	$ -	$ -
		$ 14,042			$ 11,874		$ 1,002		$ 1,166		$ -	
		$ 168,499			$ 142,484		$ 12,027		$ 13,987		$ -	

THE POTOMAC EDISON COMPANY
DATA REQUEST OF OFFICE OF STAFF'S COUNSEL
ELECTRIC STORAGE PILOT

Discovery request submitted by: Office of Staff's Counsel

Discovery request set number: Fourth

Response date: June 12, 2020

Staff-4.7

In response to Staff DR No. 1-37, please provide current DER hosting capacity of both circuits, and how the proposed pilot programs will affect this capacity.

Response:

The current hosting capacity for the Hancock – Town Hill circuit is 3,962.5 kW. This would be reduced by 1,750 kW for the battery storage project. The remaining hosting capacity would be 2,212.5 kW.

The current hosting capacity for the Great Cacapon – Little Orleans circuit is 1,963 kW. This would be reduced by 750 kW for the battery storage project. The remaining hosting capacity would be 1213 kW.